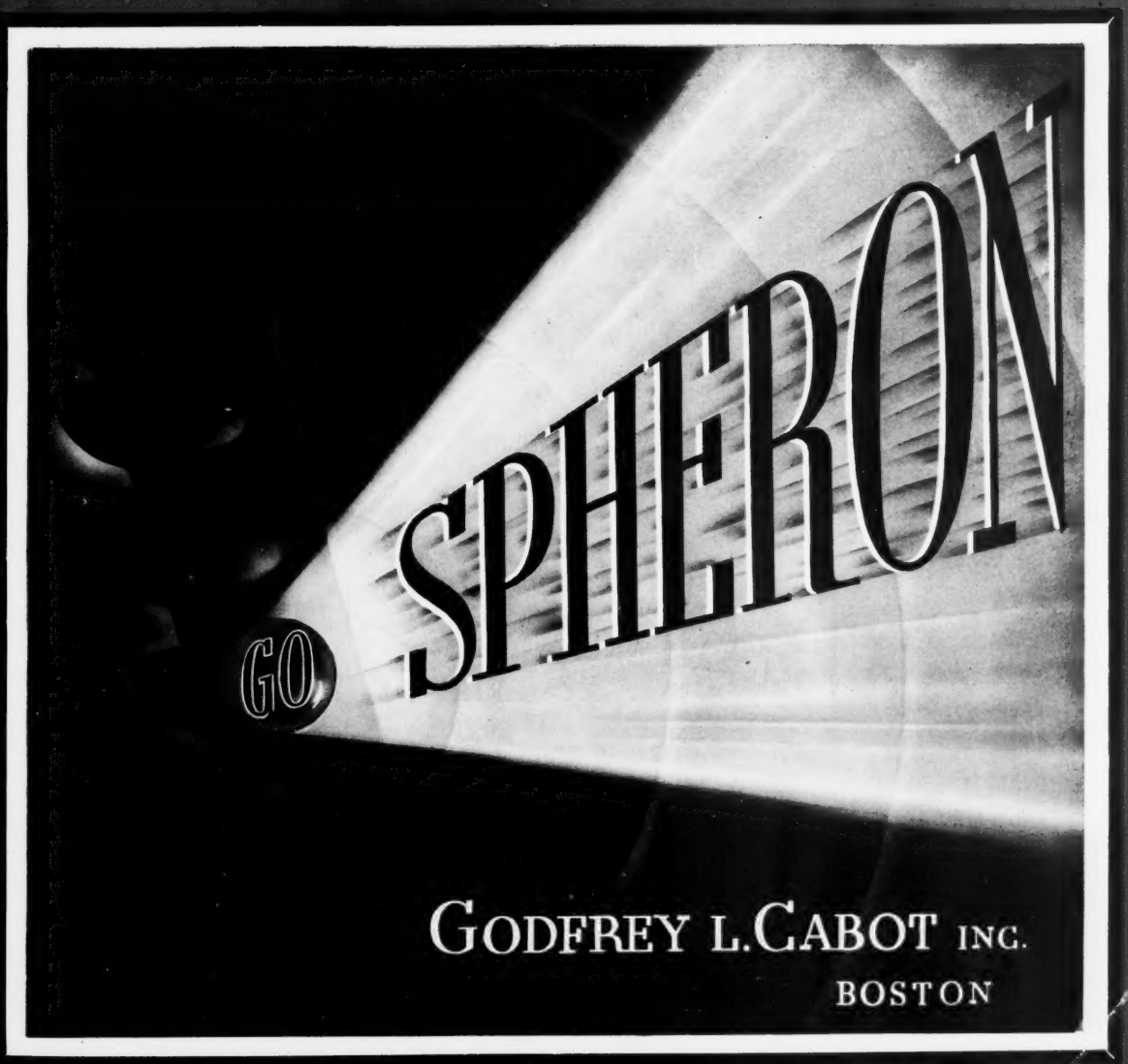
INDIA RUBBER WORLD

MAY, 1942



Newsletter No. 5 *PUBLISHED BY RUBBER CHEMICALS DIVISION OF* DU PONT *MAY, 1942*

Accelerator 2-MT and Thermoflex A Extend Life of Rubber in Dynamic Service

WITH THE USE of both crude and reclaimed rubber under drastic restrictions, it is more important than ever before to reduce waste in processing and to produce products that will render the longest possible service life. This latter result can only be obtained through the proper selection and the use of both accelerators and antioxidants. When correctly employed, Accelerator 2-MT gives excellent results in stocks subjected to dynamic service or high temperatures.

ACCELERATOR 2-MT is particularly valuable in developing the best qualities in stocks containing reclaimed rubber. However, to obtain the advantages inherent in 2-MT, it must be properly used. The following principles should be observed in compounding stocks containing reclaimed rubber:

1. Accelerator 808 should be used to activate 2-MT.
2. Sulfur should be used as follows:
   4 parts sulfur per 100 parts reclaimed rubber hydrocarbon
   3 parts sulfur per 100 parts crude rubber hydrocarbon
3. Stearic acid — *at least* 1 part per 100 parts of rubber hydrocarbon should be used.

The outstanding value of 2-MT as an accelerator for tire carcass and belt friction stocks is illustrated by the data in Table I. For comparative purposes, data on guanidine activated thiazole accelerated stocks are also shown.

COMPOUND	A & B	C & D
Smoked Sheets	22.5	11.0
Roll Brown	22.5	11.0
Whole Tire Reclaim	91.5	130.0
Clay	5.0	5.0
Thermoflex A	0.5	0.5
Zinc Oxide	5.0	3.3

Acceleration	A	B	C	D
2-MT	—	0.5	—	0.6
ACCELERATOR 808	—	0.12	—	0.15
M.B.T. derivative	0.81	—	0.45	—
Guanidine Type	0.21	—	0.3	—
Sulfur	2.8	3.5	2.8	4.0
Stearic Acid	1.0	2.0	1.0	2.0

TABLE I

Physical Test Data - Cure: 40 Minutes at 287°F.

Compound	A	B	C	D
Original				
Stress at 500% Elong.—psi	1375	1700	—	—
Tensile Strength—psi.	1525	1950	825	1175
Elongation at Break—%	530	530	435	385
Tear Strength—lbs. per in. width	50	75	50	65
Temperature rise on Flexometer* °C	113	88	108	63
Test time—minutes	20	20	8	8
Time to blow out—minutes	—	—	9	17
Aged in Oxygen at 70°C. and 300 psi for 5 Days				
Tensile Strength—psi	600	950	600	750
Elongation at Break %	305	345	350	255

*Cure: 60 minutes @ 287°

An examination of the data in Table I clearly indicates the superiority of the 2-MT-Accelerator 808 combination in stocks containing reclaimed rubber. The greater tensile and tear strengths and better retention of these properties on aging are typical of reclaim stocks accelerated with 2-MT—Accelerator 808. The improved properties of stocks accelerated with this combination have the added advantage of making it practical to use higher percentages of reclaimed rubber and still meet the requirements of the application. The importance of conserving crude rubber in this way can not be overemphasized in these times. Detailed recommendations and test data are shown in Report 41-1 entitled Accelerator 2-MT. If your copy has been misplaced we should be glad to replace it.

THERMOFLEX A should also be included in stocks that will be exposed to dynamic service conditions. It has long been recognized as the ultimate in flex-cracking antioxidants and it imparts excellent heat resistance. While Thermoflex A has in the past been used principally in the highest quality stocks, it is now important to consider it as a means of protecting and lengthening the life of all products that are exposed to flexing in service.

Through the Mill

COPPER INHIBITOR X-872-A has been proven to be the most effective safeguard against the deleterious catalytic effect of copper on the aging of rubber vulcanizates. To be sure that small amounts of copper do not cause deterioration and reduce the expected service life of your rubber products, we suggest the addition of 0.5% to 1.0% of Copper Inhibitor X-872-A on the rubber in the mix.

COLORS: We have on hand good stocks of dry powder colors and rubber dispersed colors made before the enactment of Order M-15-b. These colors are all available for shipment without restrictions.

INFORMAL REPORTS: The following recently published informal reports are available.

1. *"All-Reclaim Footwear Stocks"*
2. *"All-Reclaim Sponge"*
3. *"A Brick Red Colored All-Reclaim Rubber Stock Suitable for Bulbs and Hollow Balls"*
4. *"All-Reclaimed Rubber Compound for Light Colored Molded Items"*
5. *"Reclaimed Rubber Erasers"*

TIRES: Amendment Number 1 to the War Production Board's Supplementary Order M-15-B-1 specifies the amounts of crude and reclaimed rubber that may be used in the production of tires. In order to conform to the spirit as well as the word of the law it is necessary to build into the tires the best possible quality with the limited amount of rubber permissible.

Suggested compounds for tread and carcass stocks that meet the restrictions of this order on both passenger and truck tires are presented in a timely report entitled "Tread and Carcass Stocks Designed to Meet the War Production Board Restrictions."

RUBBER CHEMICALS DIVISION

Wilmington DU PONT *Delaware*

INDIA RUBBER WORLD, May, 1942, Vol. 106, No. 2. Published monthly by BILL BROTHERS PUBLISHING CORP., 386 Fourth Avenue, New York, N. Y., U. S. A. Entered as second class matter October 5, 1889, at the Post Office at New York, N. Y., under the act of March 3, 1879. Subscription, $3.00 a year domestic; Mexico, $3.50; all others, $4.00; single copies, 35 cents.

These 3 New Witco Developments

ARE RELIEVING RAW MATERIAL SHORTAGES IN MANY PLANTS

PERHAPS WE CAN HELP YOU TOO!

Witco Yellow, a replacement for French Ochre: Witco Blancal, an alternate for Blanc Fixe: Witcarb, an improved calcium carbonate—these three new products of Wishnick-Tumpeer research are not only relieving current raw material shortages in many applications, but are finding a permanent place in manufacturing techniques. For these products are not merely "substitutes" born of an emergency; they are definitely superior in many respects to the materials they replace.

These three developments offer convincing demonstrations of the skill and resourcefulness of Wishnick-Tumpeer's staff in dealing with raw material problems. The Research Laboratories of Wishnick-Tumpeer are thoroughly equipped to undertake such problems, particularly in the fields of chemicals, oil, pigments, asphalts, and allied products.

If you are faced with a shortage of raw materials essential to your production—or if new manufacturing conditions require modification in the properties of other materials—perhaps you, too, can benefit by Wishnick-Tumpeer's technical cooperation. Write, wire, or phone us an outline of your problem—what materials you need, what properties they must have, how they are to be used. Let our experienced research workers assist you in the effort to develop alternate or improved materials that may provide a satisfactory solution to your problem.

WITCO YELLOW

A new synthetic pigment, Witco Yellow offers interesting possibilities for replacing French Ochres in rubber manufacture. While practically the same in analysis as French Ochre, it provides these outstanding advantages:

Greater strength
Higher tinctorial value
Cleaner final tint

WITCO BLANCAL

This precipitated barium-calcium compound is available in both low and high oil grades as an alternate to Blanc Fixe. In most cases, it gives better results than Blanc Fixe, since it offers you these desirable characteristics:

Extremely fine division
Excellent color, in dry state as well as under oil
Higher bulking value

WITCARB

This new extender offers special advantages as a white reinforcing filler in rubber formulas requiring high tensile and modulus. Among the specifications that make WITCARB unusually valuable are:

Specific Gravity	2.680
Particle Size (microns) . .	2-3
Controlled pH	9.0
% Residue—325 mesh . .	0.114

Samples and complete information on any of these new products will be sent on request.

WISHNICK-TUMPEER, INC.

MANUFACTURERS AND EXPORTERS

New York, 295 Madison Avenue • Boston, 141 Milk Street • Chicago, Tribune Tower
Cleveland, 616 St. Clair Avenue, N.E. • Witco Affiliates: Witco Oil & Gas Company
The Pioneer Asphalt Co. • Panhandle Carbon Co. • Foreign Office, London, England

Too little and too late can't help you in a fight against time when every ounce of energy in your organization is straining for production and more production.

In times like these, you want a source of solvents supply that you can depend on for both the quality and quantity you must have. And when you order SKELLYSOLVE—you get just that. Any quantity within reason . . . quality that's guaranteed . . . and delivery where and when you need it.

Phone, write, or wire and we'll do the rest. Special technical service, too, if you need it.

SKELLY

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in the
RUBBER INDUSTRY

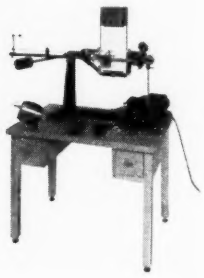
There are six different types of Skellysolve which are especially adapted to various uses in the rubber industry, for making rubber cements, and for many different rubber fabricating operations. Skellysolve offers many advantages over benzol, rubber solvent gasoline, toluol, carbon tetrachloride, etc. It will pay you to investigate Skellysolve. Write today.

SKELLYSOLVE

SOLVENTS DIVISION, SKELLY OIL CO.
SKELLY BLDG., KANSAS CITY, MO.

L3—TENSILE TESTER

L3 tests dumbbell samples up to 150 lbs. tensile, with autographic recording.

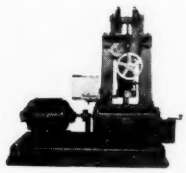


IP-2—HYSTERESIS

IP-2 is an incline-plane machine for tensile and hysteresis testing of rubber thread from 4 grams to 2000 grams.

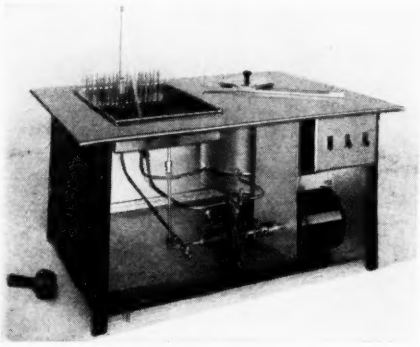
ZI—FLEXING

ZI is the standard U. S. Rubber flexing machine, producing 10,200 cycles per hour.



R—COMPRESSION

R is a compression-cutting tester, used chiefly to test the resistance-to-cutting-through of rubber coatings for wire.



T-50—STATE-OF-CURE

T-50 performs the U. S. Rubber T-50 Test which provides a quick, accurate and convenient method of determining state-of-cure.

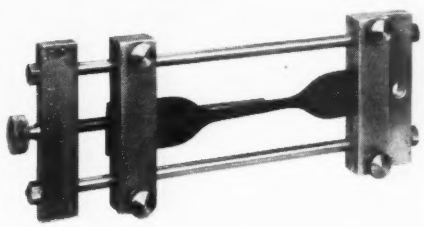
"We depend upon TESTING today more than ever before!"

SCOTT TESTERS for RUBBER

The numerous models of *Scott Testers give the rubber products manufacturer apparatus recognized as Standard the world around for physical testing: tensile, flexing, hysteresis, plasticity, compression-cutting, resistance to light aging, friction (adhesion), state-of-cure, etc. In addition to the few of our machines illustrated here, it should be emphasized that we make various others—in fact this organization is competent to fill your requirements for any type of physical test apparatus for rubber, textiles, etc. Scott Testers are recognized and approved by the specifications of leading laboratories, technical societies and Government bureaus.

NEW: Holder for ASTM Test for Light Aging

This Specimen Holder conforms to specifications for Resistance-to-Light Test as set forth by Sub-Committee XV of Committee D-11, A.S.T.M.



PRICES: 1 to 10, $15 each; 11 to 25, $12.50 each; 26 or more: $10 each. F.O.B. Providence, R. I.

Free Illustrated Bulletin on any of the subjects mentioned will be sent you promptly upon request.

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HENRY L. SCOTT CO.

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Scott Testers — Standard of the World

BANBURYS, TOO SHOULD BE OUT IN FRONT!

Banburys are leading the procession—a steady procession of production . . . Without fanfare these monsters of the mixing room must maintain their steady lead or all the parade of output falters . . . If your Banburys have shown any inclination to lag, Interstate service will correct the trouble. Our expert skill will quickly restore mixing efficiency . . . For years we have specialized in repairing and rebuilding Banburys — hard-surfacing rotors and mixing chamber parts with our own development in special hard alloy, correcting rotor contours to improve mixing efficiency and to maintain that efficiency over a longer period of service . . . Write, wire or phone us today!

If you have spare or worn Banbury parts write us at once . . . We will pay cash for them . . . Remember, too, you will be serving a patriotic cause by helping maintain some other Banbury on the production line.

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Main Plant AKRON, OHIO

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3 reasons FOR SPECIFYING

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FOR RUBBER AND RECLAIM COMPOUNDING

1 LAUREX

Fatty Acid—Activator—Plasticizer. Aids dispersion — activates acceleration — plasticizes stock—supplies soluble zinc.

2 PENTEX

Delayed Action Thiuram Accelerator. For either primary or secondary acceleration—especially safe in reclaim stocks.

3 BLE POWDER

Antioxidant. For more than ordinary protection against aging—especially where flex cracking is a problem.

PROCESS—ACCELERATE—PROTECT WITH NAUGATUCK CHEMICALS

Naugatuck Chemical

Division of United States Rubber Company

Rockefeller Center New York, N. Y.

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Here is how the beading looks as it is removed from the tire.

This Tire Has Served You Well, Now It Will Serve Uncle Sam

Too old for civilian use. This tire rates A-1A for reclaim used in insulating wire. Starting its journey through the plant of the Pequanoc Rubber Co., it and thousands of others begin a new career of service.

AURORA

The reputation of this reclaim is famous throughout the insulated wire industry. Somewhere, at this moment an Aurora stock is being extruded on wire which will open a line of communication, carry a light to a vital repair job or protect a ship against mines.

PEQUANOC RUBBER CO.

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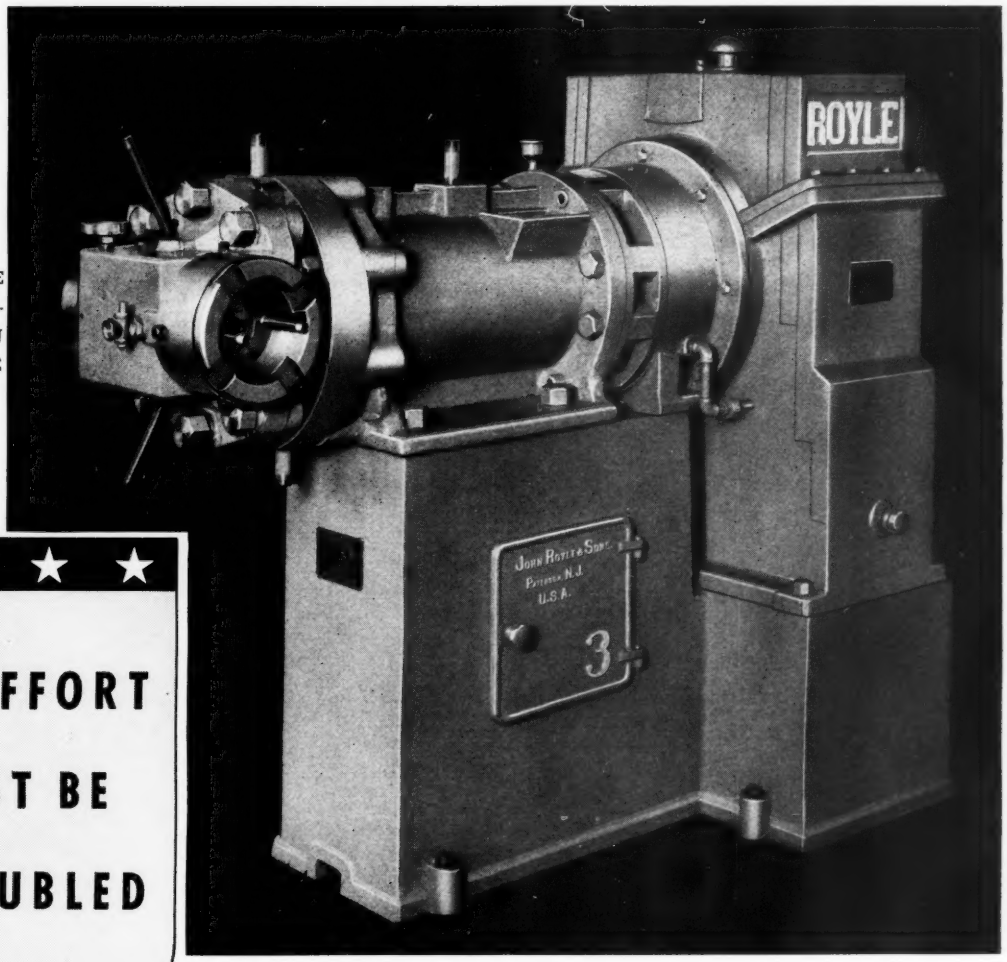


NEWEST ROYLE INSULATING MACHINE, SHOWN HERE IN No. 3 SIZE

THE EFFORT MUST BE REDOUBLED

From small and humble beginnings, America has grown. Today she is the greatest industrial nation in the world. Like the courageous pioneers who accepted every challenge with redoubled effort—we too must multiply our output.

Today, America is again pioneering. Pioneering to make herself strong. John Royle & Sons is proud to be a part of a pioneering industry that accepts the challenge of making more and better products, both for civilian and defense needs.

Advancements and improvements in production occur everyday. They will benefit you and enable us to serve you better when the emergency is over. But until that day, your patience and understanding are needed.

John Royle & Sons *Since 1855*

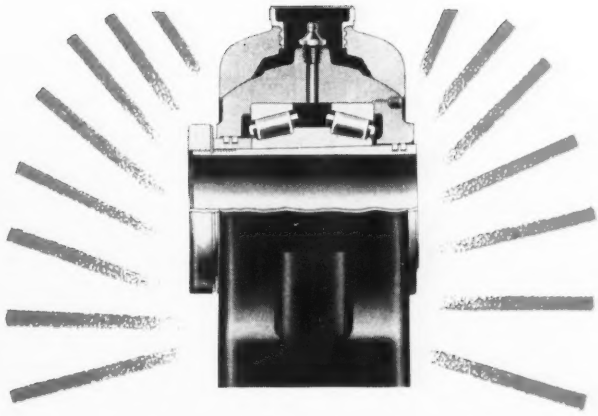
ROYLE PATERSON N J

AKRON, J. C. CLINEFELTER • • LONDON, JAMES DAY (MACHINERY) LTD.

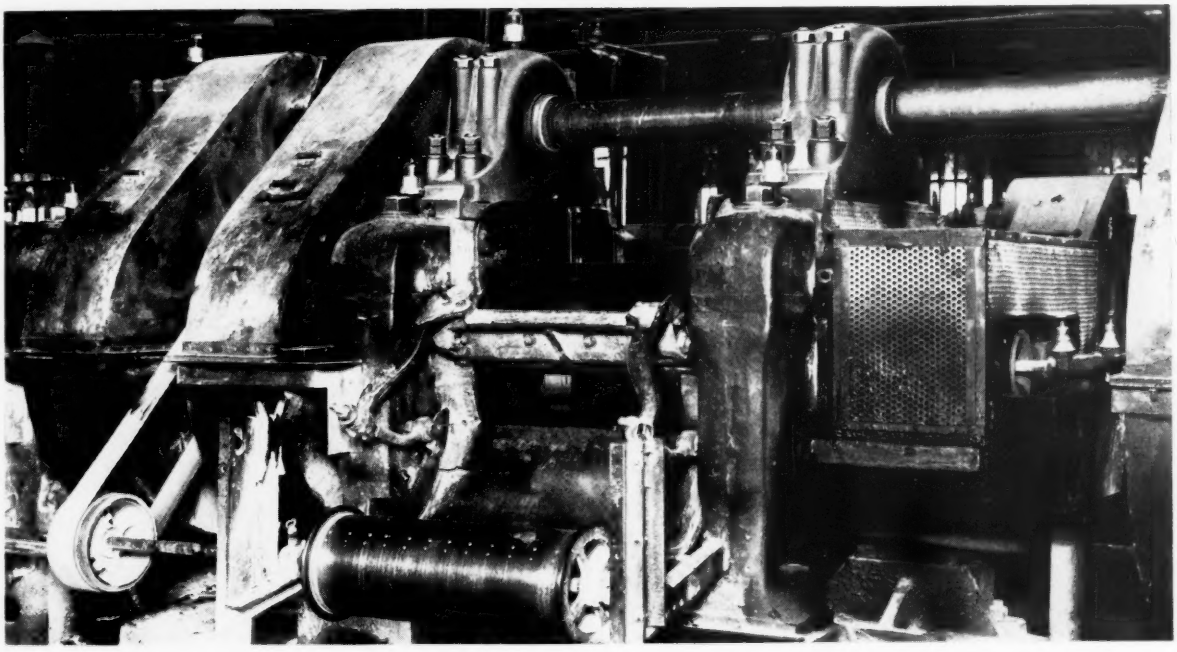
ROYLE'S 62ND. YEAR OF EXTRUDING MACHINE MANUFACTURE

WHERE TO...
Synthetics?
VISIONS of huge, new plants and the great stream of synthetic rubber which will issue from them raise the thought, "To what extent will this new product be adaptable to the making of white and light-tinted rubber goods?"
The Titanium Pigment Corporation is interested in this development. We invite rubber manufacturers who also are interested to send us their problems that we may apply our knowledge and experience in the titanium field to cooperative research.
TITANIUM PIGMENT CORPORATION
SOLE SALES AGENT
111 B'way, New York, N. Y. • 104 South Michigan Avenue, Chicago, Illinois. • 350 Townsend Street, San Francisco, Calif. 2472 Enterprise Street, Los Angeles, Calif.
TITANOX
REG. U.S. PAT. OFF.
TITANOX
TRADE MARK

Timken Bearings keep 'em turning to increase rubber production for Victory and to help meet competition afterwards.



Section through Dodge Special Duty (Adapter Type) Pillow Block showing the application of Timken Bearings.



Bearing problems in rubber machinery are not basically different from those in other kinds of machinery. They involve the same fundamental requirements—friction elimination; radial, thrust and combined load capacity; and the holding of moving parts in correct and constant alignment. Timken Tapered Roller Bearings meet these requirements in rubber mills with the same thoroughness and efficiency they display wherever applied.

The photograph shows the overhead drive shaft of a rubber mill mounted on 6" Dodge-Timken Special Duty (Adapter Type) Pillow Blocks. No shaft wear or whip; no wasted power; simplified lubrication; great endurance.

When new equipment is not obtainable, existing machines often can be brought up to modern performance standards by the application of Timken Bearings. Consult the machine manufacturer or Timken engineers.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; and Timken Rock Bits.

TO ASSURE VICTORY BUY UNITED STATES DEFENSE BONDS & STAMPS

TIMKEN

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TAPERED ROLLER BEARINGS

Photo: Schwinn "New World" War Model

For "Victory" Bike Tires— Less Rubber—More GASTEX

GASTEX and PELLETEX have long been favorite re-enforcing pigments for bicycle tire compounds. Today, with the amount of crude rubber per tire cut from 17 to 7½ ounces, higher volume loadings are recommended. With GASTEX and PELLETEX these may be made at low volume cost without appreciable impairment of the easy processing, splendid aging, and excellent abrasion resistance properties possessed by these popular blacks. This is equally true in reclaim and synthetic compounds.

For "Victory" tires and other products in which the rubber content has been necessarily reduced by the National emergency, formulators will find GASTEX and PELLETEX the answer to many difficult problems. Our Technical Department will gladly co-operate in every way.

GENERAL ATLAS CARBON DIVISION

OF GENERAL PROPERTIES COMPANY, INC.

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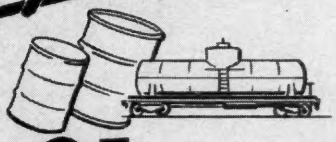
Uniform-Dependable



PICCO

PICCO Chemicals

specially prepared for the RUBBER INDUSTRY

Di POLYMER OIL for plasticizing synthetic rubber of the co-polymer butadiene types.

TYPE C RECLAIMING OIL for reclaiming synthetic rubbers.

PICCOUMARON XX SERIES RESINS (paracoumarone-indene) for extending and compounding natural and synthetic rubber.

PICCOUMARON RESINS for hardening, leatherizing or softening mechanical rubber goods.

PICCO RECLAIMING OILS (D-4, E-5, C-10) for reclaiming rubber by autoclave or pan methods.

PICCOLYTE RESINS—similar chemical analysis (carbon-hydrogen ratio) to rubber; for extending, tackifying and cementing.

This is *not* the time to experiment with unknown, uncertain materials! To keep production at top speed, you need pure, dependable raw materials, of the right quality for your processing.

Specify PICCO Chemicals, and be sure of the high quality and uniformity of your basic ingredients.

PENNSYLVANIA
INDUSTRIAL CHEMICAL CORPORATION
CLAIRTON, PENNA.

Please refer inquiries to Standard Chemical Co., Akron Savings and Loan Bldg., Akron, Ohio, sole representatives to the rubber industry.

Makers of: Coumarone Resins • Coal Tar Naphthas • Rubber Plasticizers • Reclaiming Oils • Terpene Resins

for **INSULATED WIRE**

Tensile strength
Resistance to aging
Dielectric strength

Write Our Technical Service Dept. for Details.

MOORE & MUNGER
33 RECTOR STREET - NEW YORK CITY

Increasing the quantity and guarding the quality of reclaim is a job of first importance for the forces behind the front.

Staybelite (Hercules Hydrogenated Rosin) is a valuable aid in performing this job—both for reclaiming and compounding. It is available in quantity from domestic sources at moderate prices.

Staybelite is a softener and plasticizer in the pan process for reclaiming. It resists oxidation when exposed to light and heat, and retains its light color.

Staybelite is being used to replace part of the fatty acids in tire-carcass and tread stocks. Generally, it aids processing and makes for better milling and compounding.

WRITE FOR FREE BOOKLET, "THE RECLAMATION OF RUBBER"

OTHER HERCULES AIDS TO RECLAIMING AND COMPOUNDING

Solvenol*
Tarol*

*Reg. U. S. Pat. Off.

NAVAL STORES DEPARTMENT
HERCULES POWDER COMPANY
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930 MARKET STREET • WILMINGTON, DELAWARE

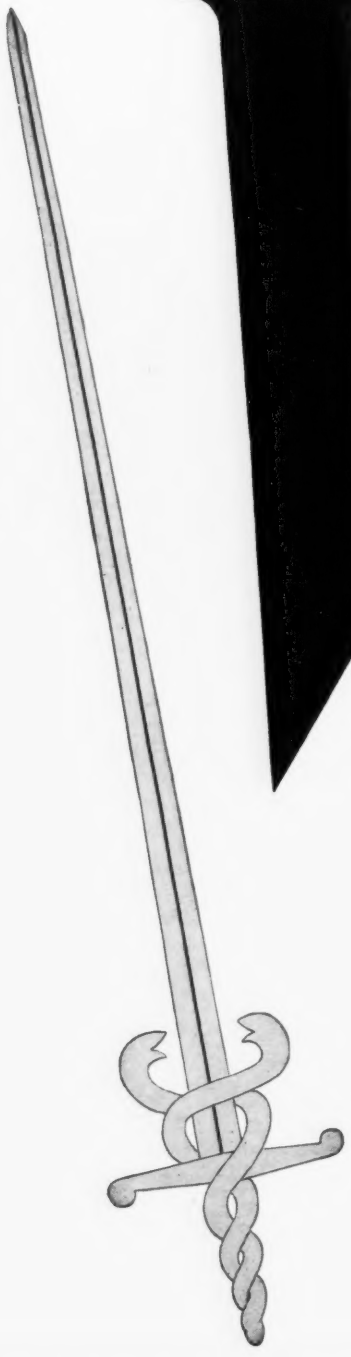
GENTLEMEN: Please send me your new folder "The Reclamation of Rubber."

*Name*_____

*Company*_____ *Title*_____

*Address*_____ *City*_____ *State*_____ LL-77

WITH YOUR AID WE SHALL BE



VICTORIOUS

in the fight against

CANCER

● Enlist in your local unit of the Women's Field Army today. Buy package labels. You can help spread the knowledge that CANCER CAN BE CURED.

● If you live in the Metropolitan Area, address the New York City Cancer Committee, 130 East 66th Street. Package labels and the Quarterly Review will be sent you for your dollar.

AMERICAN SOCIETY FOR THE CONTROL OF CANCER

New York, New York

Help Assure Victory!
COLLECT MORE AND
DELIVER MORE... Now!
YOUR SCRAP RUBBER
CAN DO IT
H. MUEHLSTEIN & CO., INC.
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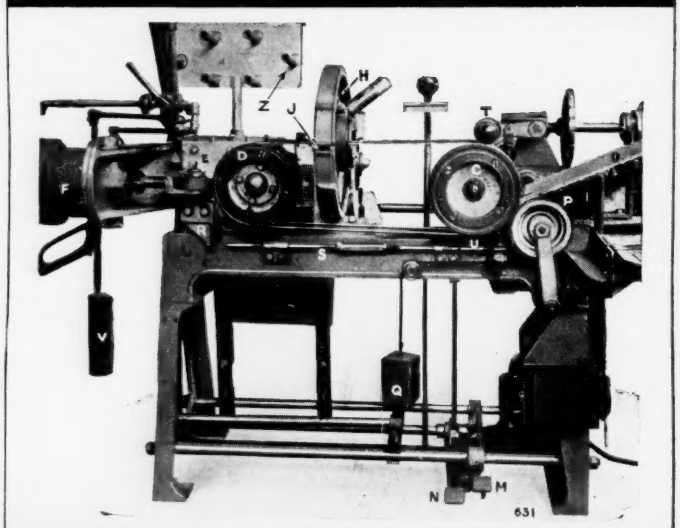
SCRAP RUBBER

MONOBAND SYSTEM

CYCLE TYRE PLANT

The "Monoband" System embodies the latest developments for making wired-on cycle tyres. This process reduces labour costs to a minimum.

The "Monoband" machine with Tread Feed builds the foundation of the tyre and applies the rubber covering, completing the whole tyre at one operation with a production of from 60-90 complete covers per hour.



SHAW

FRANCIS SHAW & CO. LTD., MANCHESTER, 11, ENGLAND

Trying to S-T-R-E-T-C-H every pound of rubber?—*use*

CALCENE

Now that every compounder is trying to make every pound of rubber go as far as possible, Calcene is proving an outstanding aid to greater production—*better* production.

This unique Calcium Carbonate pigment can be used at volume loadings far beyond any other available material. Yet Calcene has an outstanding record for actually improving such physical properties as resistance to tear, abrasion and flex cracking.

Begin now to make the most of the outstanding advantage of Calcene in your work with rubber.

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PLATE GLASS COMPANY
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Chicago	Boston	St. Louis
Pittsburgh	Cincinnati	Cleveland
Minneapolis	Philadelphia	Charlotte

Muscles for Rubber

RUBBER is a fighting word in this World War . . . a fighting product made harder, and tougher, and longer-lasting by *reinforcement with carbon black.*

Tanks, trucks, aeroplanes, artillery and naval units, in scores of different ways, depend upon rubber reinforced with carbon black for much of their fighting efficiency, maneuverability and stamina.

Carbon black literally puts "muscles" in this combat rubber. It strengthens it, toughens it and lengthens its life.

It makes our Army, Navy and air equipment fight better and last longer.

The production of carbon black for use on the factory front and on the battle front is a responsibility of the United Carbon Company. That this vital product shall be the finest that this company's resources and man-power can produce, is our Victory Pledge.

UNITED CARBON COMPANY, INC.
Charleston, West Virginia

DIXIEDENSED AND KOSMOBILE STAND FOR THE HIGHEST

DEVELOPMENT IN BLACKS FOR RUBBER COMPOUNDING.

KOSMOS-DIXIE 20, A NEW UNTREATED DUSTLESS

SEMI-REINFORCING CARBON BLACK.

• Another advertisement telling how different American industries are speeding up wartime production •

We've got to keep giving him 13 EXTRA *to win the war*

Taylor Instruments are helping America's planes fly farther faster...

▶ We'll win this war in the air. We'll win it because our planes are powered by the world's best gasoline.

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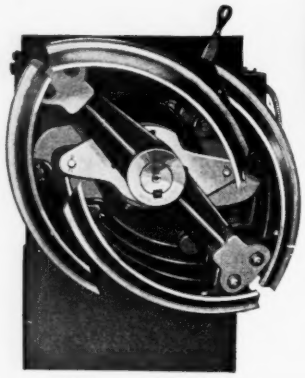

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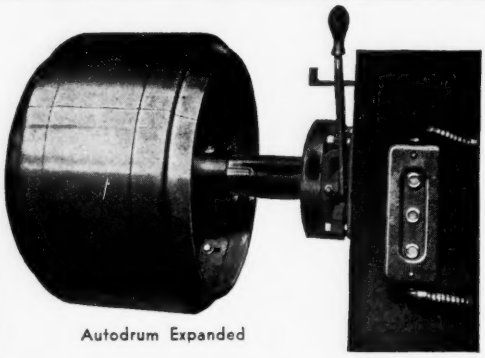

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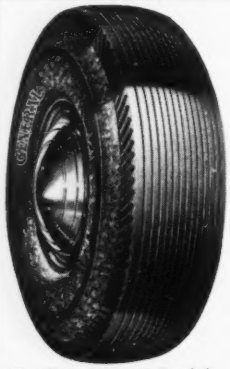

The New General Dual 8

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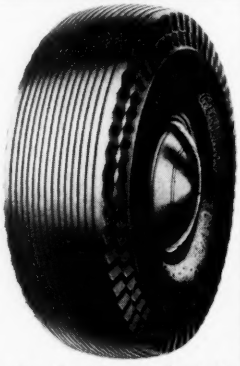

The New General Dual 10

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May, 1942

VOLUME 106 NUMBER 2

A Bill Brothers Publication

INDIA RUBBER WORLD

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NOTE—Due to an error in April Issue THERMAX "S" appeared where KALVAN "S" is in this advertisement.

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INDIA RUBBER WORLD

Published at 386 Fourth Avenue, New York, N. Y.

Volume 106 **New York, May, 1942** **Number 2**

"Thiokol"[1] Synthetic Rubber Type RD

J. W. Crosby[2]

IN VIEW of the fact that Thiokol Corp. recently announced the introduction of two new synthetic rubbers —Type FA and Type RD—it might be well to state immediately that Type RD is *not* a polysulphide reaction product.

Type RD was introduced because it represents a distinct contribution to the synthetic field. While not possessing all of the remarkable solvent-resisting properties of Type FA, it does have considerably higher physical properties, along with excellent solvent resistance in the more common types of solvents. For these reasons, Type RD is proving of definite interest to the rubber technologist and the rubber industry as a whole. It would not be in the public interest to disclose present production of Type RD except to say that it is by no means large enough.

General Description

"Thiokol" Type RD in the raw state is a tough, resilient, amber-colored solid having specific gravity of 1.03. Its odor is mild and in no way objectionable, and in finished goods the presence of RD can hardly be detected, and eventually disappears.

Type RD will undoubtedly prove to be a synthetic rubber widely useful because it possesses many characteristics comparable to natural rubber. Type RD also possesses excellent gasoline and oil resistance. High tensile strength, good abrasion resistance, and low compression set are properties readily obtained in finished products through the use of Type RD.

Type RD, moreover, presents no entirely new problem to the rubber manufacturer. The same compounding ingredients, vulcanizing agents, and accelerators he uses in compounding natural rubber and other synthetics work, generally speaking, equally well with Type RD. Similarly valuable is the excellent and easily calculated behavior of Type RD on conventional natural and synthetic rubber processing equipment.

It should, however, be realized that while Type RD —with its rubber-like properties and ready ability to be compounded and processed—will find extensive application, this new type does not displace previous "Thiokol" synthetic rubbers in proven applications, but opens up new fields through its inherent physical characteristics.

To cite two instances of this: For applications where highest possible resistance to gasoline, oil, and solvents is needed, "Thiokol" Type FA would probably prove more satisfactory. Type FA, with lower permeability to solvents and fixed gases than Type RD, would probably perform more ably in applications where diffusion is a vital factor.

The full realization of the ultimate worth of "Thiokol" Type RD for each of its many applications must, of course, await the completion of extensive developmental work by the rubber chemist. It is now possible, however, after many months of evaluation by the manufacturer of "Thiokol", to make the following statements concerning it.

"Thiokol" Type RD is resistant to gasoline, oils, and a great many solvents.

In Table 1 will be found composition of three typical RD stocks; while Table 2 gives the per cent. linear swell and general condition of these stocks after immersion in various solvents and chemical solutions at 75° F. for three months.

TABLE 1

Compound No.	552M-3	552M-4	552M-5
"Thiokol" RD	100	100	100
Zinc oxide	5	5	5
Semi-reenforcing carbon black	20	40	40
Stearic acid	1	1	1
Phenyl-beta-naphthylamine	2	2	2
Benzothiazyl disulphide	1	1	1
Sulphur	1.5	1.5	1.5
Dibutyl sebacate	..	20	..
Plasticizer P-1	..	..	20
Cure (mins./°F.)*	15/274	15/274	15/274
Tensile lbs./sq. in.	3300	2520	2330
Elongation %	510	580	650
Duro	61	53	51

*Press cured sheets.

Physical Characteristics

Exhaustive laboratory tests have shown that "Thiokol" Type RD stocks having tensile strengths in excess of 3,000 pounds per square inch, with an elongation at break of more than 400%, and a Shore hardness reading

[1] Trade Mark, Reg. U. S. Pat. Off.
[2] Thiokol Corp., Trenton, N. J.

TABLE 2. PER CENT. LINEAR* SWELL AND CONDITION OF "THIOKOL" TYPE RD IN VARIOUS SOLVENTS

Immersion Test at 75° F. for 3 months. A minus sign indicates shrinkage.

	Stock No. 552M-3 Swell	Stock No. 552M-3 Cond.	Stock No. 552M-4 Swell	Stock No. 552M-4 Cond.	Stock No. 552M-5 Swell	Stock No. 552M-5 Cond.
Petroleum Hydrocarbons and Aromatic Blends						
Gasoline	3.8	OK	—1.3	OK	0.0	OK
Kerosene	1.5	OK	—1.8	OK	— .8	OK
No. 2 fuel oil	2.5	OK	0.0	OK	.8	OK
Motor oil	.5	OK	—1.8	OK	—1.3	OK
Circo light	.5	OK	—2.3	OK	—1.3	OK
80/20K/B†	7.8	OK	2.3	OK	3.3	OK
50/50K/B	17.0	OK	11.0	OK	11.8	OK
Aromatic Hydrocarbons						
Benzol	41.3	Tender	31.3	Tender	36.3	Tender
Toluol	34.0	Tender	26.0	Tender	30.5	Tender
Xylol	26.5	OK	21.8	OK	17.5	OK
Vegetable Oils						
Cotton seed oil	0.0	OK	—2.5	OK	—1.5	OK
Corn oil	.3	OK	—2.0	OK	—1.5	OK
Linseed oil	.5	OK	—2.0	OK	—1.5	OK
Turpentine	5.5	OK	1.5	OK	3.0	OK
Pine oil	29.8	OK	21.0	OK	25.8	OK
Lacquer Thinners						
Acetone	41.3	Tender	34.5	Terder	37.5	Tender
Methyl ethyl ketone	47.5	Tender	39.0	Tender	45.0	Tender
Ethyl acetate	33.8	Tender	25.0	Tender	33.8	Tender
Cellosolve	15.0	OK	10.3	OK	11.0	OK
Cellosolve acetate	41.0	Tender	33.8	Tender	39.5	Tender
Methyl cellosolve	17.5	OK	10.0	OK	12.8	OK
Chlorinated Hydrocarbons						
Carbon Tetrachloride	21.3	Tender	14.0	OK	15.5	OK
Ethylene dichloride	64.5	V.Tender	56.3	V.Tender	62.5	V.Tender
Chloroform	71.8	V.Tender	59.3	V.Tender	68.8	V.Tender
Trichlorethane	72.5	V.Tender	61.3	V.Tender	67.5	V.Tender
Propylene dichloride	63.8	V.Tender	49.8	V.Tender	59.0	V.Tender
Dichlorethylether	53.8	Tender	46.3	Tender	51.3	Tender
Monochlorobenzene	54.8	Tender	44.0	Tender	52.5	Tender
Water and Anti-Freeze Solutions						
Water	4.0	OK	5.0	OK	6.8	OK
Methanol	5.8	OK	.3	OK	1.5	OK
50/50 Methanol/water	7.3	OK	10.0	OK	11.8	OK
Prestone	1.3	OK	—.5	OK	.3	OK
50/50 Prestone/water	1.3	OK	2.0	OK	2.8	OK
Glycerine	.5	OK	.8	OK	1.0	OK
Glycerine/water 50/50	.5	OK	1.0	OK	1.0	OK
Acids						
Conc. HCl		Brittle		Brittle		Brittle
50% HCl	1.8	Sl. Stiff	.5	Sl. Stiff	1.0	OK
Conc. H_2SO_4		Decomposes		Decomposes		Decomposes
50% H_2SO_4	12.5	Brittle	11.0	Brittle	12.0	Brittle
Conc. HNO_3		Decomposes		Decomposes		Decomposes
50% HNO_3		Decomposes		Decomposes		Decomposes
Glacial acetic acid	33.5	Tender	26.8	OK	32.8	OK
Alkalies						
20% NaOH	.5	OK	0.0	OK	—1.5	OK
10% NaOH	1.0	OK	0.0	OK	— .8	OK
Salt Solutions						
5% NaCl	2.5	OK	2.5	OK	3.3	OK
10% NaCl	1.3	OK	1.3	OK	1.3	OK
10% $CuSO_4$	3.0	OK	3.5	OK	3.8	OK
10% $ZnCl_2$	2.0	OK	2.3	OK	2.3	OK
3% Hypochlorite‡	2.5	OK	1.8	OK	1.5	OK

*Linear swell was obtained by measuring increase in length of strips 4 by ½ by $\frac{1}{32}$-inch.
†80/20K/B designates a blend of 80% kerosene and 20% benzol by volume.
‡In this test the hypochlorite solution was changed weekly.

TABLE 3. GRAMS/SQ. IN./24 HRS. THROUGH SHEETS $\frac{1}{32}$-INCH THICK

Aviation gasoline	.007 (ave. for 28 days)
40% aromatic blend*	.043 (ave. for 25 days)

*40% aromatic blend consisted of 100 octane aviation gasoline 60%, Xylol 15%, toluol 20%, benzol 5%.

of less than 60 are readily obtained and can be repeatedly produced.

As measured by a DeMattia flexing machine, "Thiokol" Type RD stocks exhibit good resistance to flex cracking.

"Thiokol" RD stocks can be compounded to give a wide range of hardnesses through the use of plasticizers or reenforcing pigments. Type RD does not cure to the hard rubber state when sulphur is added to it. The new synthetic rubber exhibits impressive resistance to diffusion of gasoline and gasoline-aromatic blends. (See Table 3.) The diffusion of air, hydrogen, and carbon dioxide through "Thiokol" Type RD is also lower than it is through natural rubber, but as has been noted, the diffusion of these substances is greater than with "Thiokol" Type FA.

Rubber chemists will probably be interested in learning that "Thiokol" Type RD stocks show abrasion resistance comparable to high-grade natural rubber stocks. This is a distinctive feature of this synthetic and one of the chief reasons why it may be expected to be used in mechanical rubber goods for heavy industrial use and other products which receive rough treatment.

The compression set of "Thiokol" Type RD stocks is influenced by compounding and curing, but its resistance to cold flow is comparable to the cold flow resistance of natural rubber stocks. This refusal of Type RD to take on a set, when subjected to prolonged compression, will prove an asset in making gaskets, engine mountings, and many other molded goods.

Tests indicate that "Thiokol" RD stocks will satisfactorily withstand the deteriorating effect of hot oil-water emulsions. Extensive tests have also revealed that "Thiokol" RD stocks can be compounded to resist hot oil and successfully withstand immersion in such fluids, up to at least 250° F.

It is also interesting to note that "Thiokol" RD stocks show good aging characteristics in the Geer oven, the Bierer-Davis oxygen bomb and the air bomb at 300° F. (Table 4.)

TABLE 4

	Percentage Change		
	Tensile Strength	Elong.	Duro Change
1 year natural aging	Less than ± 5%	Less than —10%	0
1 week oxygen bomb	Less than ± 5%	Less than —10%	0
4 weeks Geer oven at 158° F.	About +10%	About —30%	+10 points
24 hrs. air bomb at 300° F.	About —20%	About —50%	+15 points

Compounding and Processing

"Thiokol" RD is compounded, vulcanized, and processed to develop its maximum rubber-like properties in very much the same way as natural rubber. Like natural rubber, "Thiokol" RD is subject to very wide variations through compounding. Table 5 gives an indication of the wide range in the quantities of various compounding materials possible in formulating RD stocks.

TABLE 5

"Thiokol" RD	100 parts
Zinc oxide	3 to 5 parts
Plasticizer P-1 or dibutyl sebacate	0 to 30 parts
Secondary plasticizers*	0 to 75 parts
Reenforcing pigments and fillers	20 to 300 parts
Stearic acid	1 to 5 parts
Organic rubber accelerator	0 to 2.0 parts
Sulphur	.5 to 5.0 parts
Antioxidant	1 to 2 parts

*By secondary plasticizers are meant the types as used with natural rubber such as the Bardols, Cumars, pine tars, etc.

"Thiokol" RD shows some breakdown when worked on a cold mill, and in practice it is customary to give it about five minutes of breakdown before adding the compounding materials. However it has been noticed that a considerable breakdown is obtained by prolonged milling of certain mixed stocks on a cold mill. In practice, though, the plasticity is controlled through the use of a plasticizer.

Practically all of the liquid plasticizers used with rubber and the other synthetics exert a plasticizing action on "Thiokol" RD. But these do not behave the same way in all respects in "Thiokol" RD as they do in other materials. Plasticizer P-1 and dibutyl sebacate improve the low temperature flexibility of RD stocks and should be used in all stocks that must remain flexible at low temperatures. Less expensive plasticizers can be used in conjunction with these to obtain higher loadings for a given hardness or for obtaining low hardness stocks. Some such plasticizers are the Bardols, Cumars, pine tars, pine oils, etc.

High tensile strength stocks can be developed by the use of reenforcing pigments. The soft or thermatomic blacks disperse readily in RD and produce high tensile strength. These blacks can be used in greater amounts for a given durometer hardness than can the channel blacks.

White pigments such as blanc fixe, titanium pigments, lithopone, zinc oxide, and clay reenforce "Thiokol" RD, and relatively high tensile strength compounds are possible through the use of these pigments. The average run of whitings shows very little reenforcing value.

It has not been proved that stearic acid is essential. Yet it is felt that it may serve as an aid to proper pigment dispersion and may also influence the activation of zinc oxide. For these reasons the manufacturer feels that it should be used.

Zinc oxide serves as an accelerator of vulcanization in straight sulphur cures, and it definitely activates the acceleration of certain organic accelerator. While zinc oxide may not be required with all accelerators, the manufacturer's experience to date indicates that it should be used in all RD compounds.

Organic accelerators, as used with natural rubber, greatly accelerate the vulcanization of "Thiokol" RD. Generally speaking, they behave about the same way they do in natural rubber, as regards rate of cure. Stocks that will cure at room temperature can be obtained with the ultra-accelerators.

Sulphur serves as a vulcanizing agent. Usually from 0.5-part to two parts are used with one part of accelerator. The higher the amount of sulphur up to two to three parts, the better the tensile strength. However the higher the sulphur, the greater is the tendency for the stock to stiffen up in modulus and lose elongation with overcure. With stocks containing high amounts of plasticizer from 1.5 to two parts of sulphur should be used.

Antioxidants may or may not be required in an RD mix for good aging. The manufacturer believes, however, that it may be beneficial in some instances and recommends using from 1% to 2% on the RD. Most of the antioxidants used with natural rubber are satisfactory.

In mixing on a mill it is recommended that the RD be broken down for five minutes. All the compounding ingredients except the sulphur are added together. The dry pigments soak up the plasticizer so that the mixture can be added as a paste. The sulphur is added last. "Thiokol" RD is not difficult to mill and except for very highly accelerated stiff stocks does not scorch readly. Although not sensitive to "bin set-up", mixed stocks should be cooled before piling or storing.

"Thiokol" RD stocks can be cured in molds, in water, open steam, or hot air as the case requires. In mold curing the part does not have to be cooled before it is ejected from the mold. With the mercapto-type accelerators the stock sets up very rapidly at vulcanizing temperatures, but has a wide curing range. In press cures, on thin sheets a stock containing one part of Altax and 1.5 parts of sulphur will show a good cure in 15 minutes at 274° F. This same stock will not be overcured in 60 minutes at 307° F. and is not sensitive to scorching.

The amine-type accelerators require about 30 minutes at 298° F., or its equivalent, to reach a good cure on thin sheets. These stocks also maintain a long curing range.

"Thiokol" RD can be mixed on factory or laboratory mills with little or no difficulty. It bands readily to the rolls and takes up pigments rapidly. The compounds can also be mixed in a Banbury, using the same procedure usually applied to natural rubber stocks.

"Thiokol" RD compounds feed easily into a tuber and extrude at a rapid rate. Because the stock tends to build up more heat from mechanical working than do natural rubber stocks, compounds to be extruded should be reasonably soft. A procedure that has been found satisfactory is to feed warm stock to a tuber with a cold to slightly warm barrel and a hot head.

Small-diameter products can be cured in soapstone packs in open steam without collapsing or blistering.

TABLE 6. COMPOSITION AND PHYSICAL PROPERTIES OF BLACK STOCKS

Stock No. 636M	1	2	3
"Thiokol" RD	100	100	100
Zinc oxide	5	5	5
P-33	60	..	..
Thermax	..	120	175
Plasticizer P-1	20	20	25
Cumar P-25	..	..	10
Stearic acid	1	1	1
Phenyl-beta-naphthylamine	1	1	1
Benzothiazyl disulphide	1	1	1
Sulphur	1.5	1.5	2

Stock No.	Cure Mins./°F.	Moduli 100	Moduli 300	Tensile psi	Elong. %	Duro (Shore)
636M-1	15/274	250	870	2950	495	55
	60/274	280	1200	2780	420	52
636M-2	30/274	380	1580	1675	350	67
636M-3	30/274	305	985	1060	350	70

Stock No. 636M	4	5
"Thiokol" RD	100	100
Zinc oxide	5	5
Kalvan	90	..
Clay	..	112
Plasticizer P-1	20	20
Stearic acid	1	1
Phenyl-beta-naphthylamine	1	1
Benzothiazyl disulphide	1	1
Sulphur	2	2

Stock No.	Cure Mins./°F.	Moduli 100	Moduli 300	Tensile psi	Elong. %	Duro (Shore)
636M-4	45/274	100	280	2175	550	51
636M-5	30/274	565	1250	1600	400	67

In making braided and Chernac loom hose, adhesion to the braid is obtained largely through mechanical anchorage in the yarn. For best adhesion the stock should be soft enough to flow into the openings in the woven or braided jacket. In braided hose the use of a cement helps greatly.

The usual practice as applied to natural rubber friction stocks can be used with RD friction compounds. (See Table 7.)

TABLE 7. TYPICAL FRICTION FORMULA—RD

Stock No. 621M-21			
"Thiokol" RD	100	Cumar P-25	20
Zinc oxide	5	Rosin	12
Thermax	50	Phenyl-beta-naphthylamine	1
Plasticizer P-1	20	Benzothiazyl disulphide	1
Bardol B	20	Sulphur	2

"Thiokol" RD compounds give smooth sheets when calendered, which are rather dry. The surface should be washed with a solvent to render it tacky for building up. If the compound contains Cumar, Bardol, or such secondary plasticizers, it is rendered more tacky when washed. Methyl ethyl ketone, ethylene dichloride, and acetone can be used for washing.

"Thiokol" RD compounds can be easily molded and can be ejected from hot molds without pock marking or blistering. Since RD does not absorb air so readily as does natural rubber, some care should be exercised to eliminate trapped air in the raw blanks and in the mold. "Bumping" the press is often helpful in eliminating trapped air. The molding of large sheets from "Thiokol" RD stocks is relatively simple.

The preparation of "Thiokol" RD cements or dispersions is possible from almost any typical compound provided the mixed stock is given a thorough breakdown on a cold mill before attempting to disperse it. For this breakdown the amount of stock put on the mill should be small and the mill rolls should be kept cold while the stock is being milled. *This is the most important operation in making RD dispersions.* Breaking down of the crude RD is not so effective as breakdown of the mixed stock.

The broken down stock can then be dispersed in methyl ethyl ketone, ethylene dichloride, benzol, acetone, or mixtures of these, in appropriate mixers. The amount of stock dispersed for a given viscosity depends on the compound and the breakdown.

Generally speaking from one pound to 1.5 pounds of stock to a gallon of solvent gives a free flowing dispersion.

Production of Chicle and Jelutong[1]

A Jelutong Tree

THE gradual displacement of chicle by jelutong as a base for chewing gum during the last few years is indicated in recent export and import statistics issued by Census of Manufacturers, United States Department of Commerce. The chewing gum industry used 12,993,999 pounds of chicle and 6,213,333 pounds of crude gum (largely jelutong) in 1937; the figures for 1939 are 8,568,267 pounds of chicle and 11,468,663 pounds of crude gum. Chewing gum, which has been sold in this country since about 1870, first used imported chicle for a "gum-base" in 1884; while jelutong once regarded as an inferior type of rubber, has been used as a chewing gum base in admixture with other materials only since 1922. In 1937 the wholesale value of production in the chewing gum industry was $54,084,494, and chewing gum exports, which have been increasing since 1932, were valued at $1,176,524.

Although chicle and jelutong imports into the United States were nearly equal in 1939 (14,679,178 pounds of crude chicle and 13,873,449 pounds of crude and refined jelutong), jelutong imports approximately doubled chicle imports during the 1932-38 period, and in the 1923-29 period the ratio of jelutong to chicle imports was about three to two. Imports of both materials were about equal in 1930 and 1931 at roughly thirteen million pounds yearly. The all-time high for jelutong imports was reached in 1910 and 1911 when about fifty million pounds were imported yearly; following these two years, imports declined until about 1921.

Most chicle comes from Mexico, which exported 10,925,539 pounds to the United States in 1939. Other sources were: British Honduras, 1,701,645 pounds; Guatemala, 2,051,220 pounds; Costa Rica, 537 pounds; and other countries, 237 pounds. The largest producer of jelutong is Netherlands India, but since about 75%[2] of the total jelutong crop passes through Singapore, where some of it is refined to various extents, most jelutong is imported from British Malaya. In recent years the imports from Malaya have been approximately six times those from Netherlands India. In 1939, Malaya sent the United States 11,947,801 pounds; while Netherlands India sent 2,925,684 pounds. Malayan domestic production, for all states, Federated and Unfederated, has been roughly 2,250,000 pounds annually for a number of years.

Preparation of Chicle

Chicle is the coagulated latex of the sapodilla tree, *Achras zapote L.*, which is native to Central America, growing best in the calcareous soils of the Yucatan Peninsula. There is no such thing as a chicle plantation; the material must be obtained from trees growing wild, and tappable trees are usually found only in the density of about two per acre. The sapodilla is from 50 to 80 feet high, has a diameter of three feet, a dense rounded or conical crown, white flowers, and the fruit is a berry. The most productive trees are 18 inches in diameter, and 30 feet high to the first branch. The first tapping of such a tree may yield from four to five pounds of latex, the second tapping about two pounds, and a third tapping rather less. The more accessible forests have been so overworked that such yields are no longer general.

Wandering chicle collectors (*chicleros*) carry machetes, climbing ropes, and canvas latex collecting bags. If the tree selected by the *chiclero* is satisfactory, a collecting bag is fixed to its base, and a series of zig-zag cuts, spaced at about 18 inches, are made in the trunk by the tapper who climbs the tree as he wields his machete. Many mature trees have been destroyed by machetes biting too deeply and killing the cambium. The latex collected by the *chicleros* is boiled in an open vessel of some 40 gallons capacity until it is sufficiently concentrated, when it is removed from the vessel, placed on a piece of canvas, and kneaded into blocks of five to 25 pounds. After drying for two or three days the blocks are packed for export in bales or sacks which normally contain 100 pounds of chicle. Chicle is sold by weight and also by the moisture content, which is tested by buyers.

Preparation of Jelutong

Jelutong, or pontianak, is the coagulated latex of trees belonging to the genus *Dyera*. The jelutong tree is about 150 feet high and ten feet in diameter with a large spreading crown occupying slightly more than half the height. Most commercial jelutong is derived from two species, *D. costulata* Hook. f. and *D. lowii* Hook. f. Although the two species are similar in appearance, the former inhabits dry land and is found mainly in Malaya; while the latter is found in swampy areas, largely in Borneo. Both species occur in Sumatra.

A V-shaped cut embracing half the circumference of the trunk, with the bars of the V inclined at about 45° to the vertical, is made in the tree with a semi-circular gouge about one inch in diameter. The V looks as though it were lying on its side. Removing a narrow strip from the upper and lower surface of the cut reopens it when desirable, usually on alternate days. The latex flows down the two cuts out of the lower end of the bottom cut; some coagulates during this passage, but the loss is said to be negligible. This method, which appears to have

(*Continued on page* 138)

[1] Except for the U. S. Department of Commerce figures in the first paragraph, this article is abstracted from "Chicle, Jelutong, and Allied Materials" in *Bulletin of the Imperial Institute*, July-Sept., 1940, pp. 299-329.

[2] U. S. Department of Commerce.

Extendex C—A New Rubber Extender

H. F. Schwarz[1]

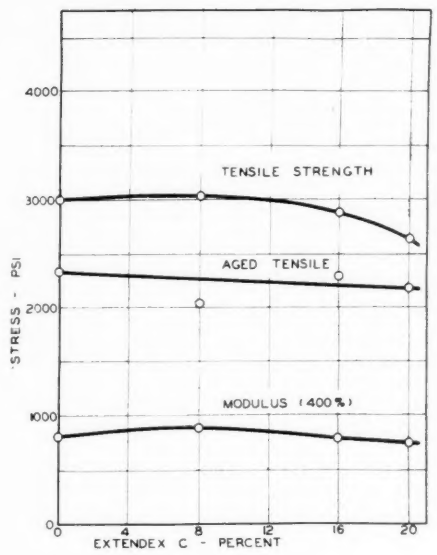

Fig. 1

EXTENDEX C, a newly developed rubber compounding material, has a wide range of application in the rubber industry. As an extender for crude rubber, reclaim, and synthetic rubber, it may be used to replace part of the rubber hydrocarbon in all types of compounds. It is therefore especially useful under present conditions when diminishing supplies of rubber and reclaim make it imperative that existing stocks be made to produce as large a volume of finished products as possible without lowering physical qualities.

This article describes briefly Extendex C and the properties it imparts to rubber and reclaim compounds.

Composition

Extendex C is a sticky sponge-like material with about the same resilience as a soft uncured rubber compound. It has a specific gravity of 1.03. Being insoluble in common organic solvents and water, it may be used in most compounds requiring chemical resistance.

It is produced from selected vegetable oils by a patented process[2] in which the oils are subjected to chemicals at high temperatures, resulting in a molecular rearrangement to form an intermediate product. This product is then vulcanized with typical rubber compounding ingredients. The production is carefully controlled so that a material of consistent quality is produced.

Although Extendex C is made from vegetable oils, it should not be confused with the various grades of vulcanized oils since it is produced from different oils and by entirely different methods. A study of the data presented below will show that Extendex C produces different physical properties in rubber than do vulcanized oils.

Compounding Principles

Extendex C may be used to replace crude rubber or reclaim in all types of compounds containing all common types of ingredients. The amounts of rubber which may be replaced without loss of physical qualities ranges from 5% to 20%, depending upon the amount of pigment contained in the compound. In general it is found that the less pigment the stock contains, the more Extendex C may be added without decrease of properties.

It has been found that Extendex C enters into the vulcanization reaction of the rubber and that it requires the same amounts of sulphur, accelerator, and zinc oxide as does the rubber hydrocarbon. For that reason it is recommended that when Extendex C is substituted for rubber in a formula, no change be made in the quantities of sulphur and accelerator used.

Although the stocks described in this report have been compounded with thiazole-type accelerators, Extendex C has been found to be useful with all accelerators that have been tested thus far.

In addition to acting as an extender for rubber, Extendex C also serves as a plasticizer, thereby making the uncured stock process more easily on the mill, tuber, or calender. If it is not important to obtain easier processing qualities, the pigment may be increased at the same time that rubber is replaced by Extendex C. The tire tread type of compound described below has been so treated.

Extendex C has been found to act as a dispersing agent for carbon black in heavily loaded compounds. Therefore when it is used as a replacement for rubber, other dispersing agents may be omitted. For maximum extension of rubber, however, it is desirable to retain the normal dispersing agents and add more pigment to compensate for the plasticizing effect.

Typical Applications

In a pure gum stock the replacement of rubber by Extendex C has the following effects on the properties of the stock: no change in ultimate tensile strength up to about 20% replacement; slight increase in modulus up to about 30% replacement; substantially no change in elongation and properties after accelerated aging up to about 40% replacement. Since pure gum stocks have little interest at present, no detailed data are presented for them.

In a part-reclaim stock such as might be used for a tire carcass, replacement of rubber by Extendex C causes a slight increase in modulus and substantially no change in ultimate tensile strength up to about 16% replacement. No significant change in physical properties after accelerated aging in the oxygen bomb is noted up to 20% replacement. Properties of a part-reclaim carcass stock are tabulated in Table 1 and shown graphically in Figure 1.

In a tire tread stock up to 10% of the rubber may be replaced by Extendex C with only 4% reduction in ultimate tensile strength, but modulus is decreased by 15%. Abrasion loss as measured on the du Pont abrader, heat build-up as measured on the Goodrich flexometer, and tensile strength after aging are substantially unchanged up to 10% replacement. The properties of this stock are shown in Table 2 and Figure 2. Note that the channel carbon black was increased one part per 5 parts Extendex

[1] With Wishnick-Tumpeer, Inc., 295 Madison Ave., New York, N. Y.
[2] United States patents Nos. 2,189,772; 2,213,944; 2,234,545.

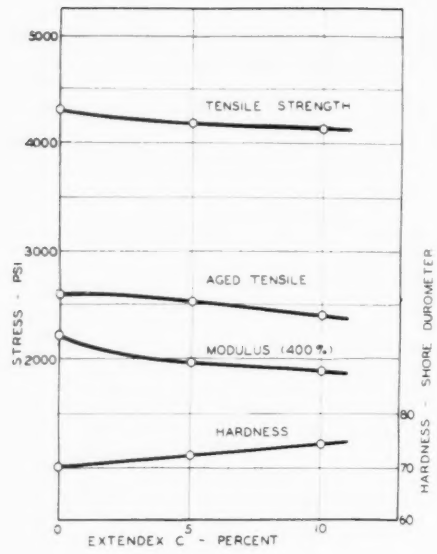

Fig. 2

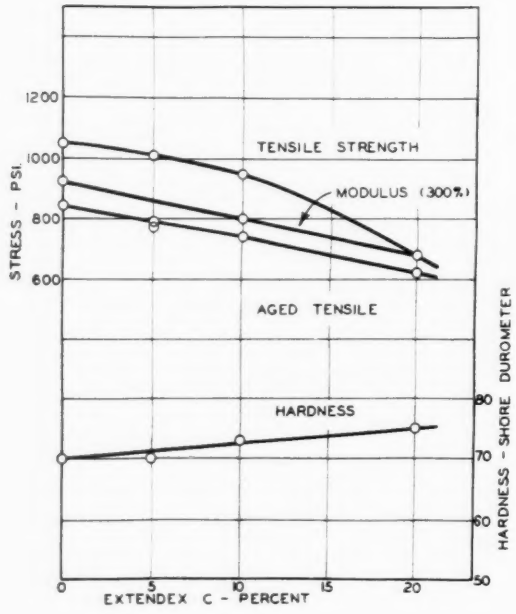

Fig. 3

TABLE 1

Formulas	1-A	1-B	1-C	1-D
Smoked sheet	85.	77.	69.	65.
Whole tire reclaim (50% rubber)	30.	30.	30.	30.
Witcarb	10.	10.	10.	10.
Zinc oxide	3.	3.	3.	3.
Stearic acid	1.	1.	1.	1.
Pine tar	3.	3.	3.	3.
Phenyl-beta-naphthylamine	1.	1.	1.	1.
El Sixty	1.	1.	1.	1.
Sulphur	2.75	2.75	2.75	2.75
Extendex C	...	8.	16.	20.
Properties	**1-A**	**1-B**	**1-C**	**1-D**
Optimum press cure at 280° F. (minutes)	30	30	20	20
Modulus at 400% at optimum (psi)	820	880	780	750
Tensile strength at optimum (psi)	3000	3040	2880	2640
Elongation at optimum (%)	630	630	670	660
Tensile after oxygen bomb aging (48 hrs. at 70° C. and 300 psi)	2340	2060	2300	2180
Change in tensile after aging	—22%	—32%	—20%	—17%

C to compensate for the plasticizing effect of the Extendex C.

TABLE 2

Formulas	2-A	2-B	2-C
Smoked sheet	100.	95.	90.
Zinc oxide	5.	5.	5.
Stearic acid	3.	3.	3.
Pine tar	3.	3.	3.
Phenyl-beta-naphthylamine	1.	1.	1.
Captax	0.75	0.75	0.75
Sulphur	2.8	2.8	2.8
Channel carbon black	50.	51.	52.
Extendex C	...	5.	10.
Properties	**2-A**	**2-B**	**2-C**
Williams plasticity at 70° C. (cm.)	.392	.392	.381
Optimum press cure at 287° F. (mins.)	75	60	60
Modulus at 400% at optimum (psi)	2210	1960	1880
Tensile strength at optimum (psi)	4300	4190	4130
Elongation at optimum (%)	600	600	590
Abrasion loss on du Pont abrader (c.c./hp. hr.)	191	204	191
Hardness (Shore durometer)	70	72	74
Tensile after oxygen bomb aging (48 hrs. at 70° C. and 300 psi)	2590	2520	2390
Change in tensile after aging	—40%	—40%	—42%

In an all-reclaim mechanical goods type of compound Extendex C may replace rubber hydrocarbon with slight loss in properties up to 5%. The data on this type stock are given in Table 3 and Figure 3.

TABLE 3

Formulas	3-A	3-B	3-C	3-D
Whole tire reclaim (60% rubber)	167.	158.	150.	133.
Whiting	75.	75.	75.	75.
Zinc oxide	3.	3.	3.	3.
Stearic acid	1.	1.	1.	1.
Phenyl-beta-naphthylamine	1.	1.	1.	1.
Santocure	0.6	0.6	0.6	0.6
Diphenylguanadine	0.6	0.6	0.6	0.6
Sulphur	2.5	2.5	2.5	2.5
Extendex C	..	5.	10.	20.
Properties	**3-A**	**3-B**	**3-C**	**3-D**
Optimum press cure at 287° (mins.)	30	30	30	30
Modulus at 300% at optimum (psi)	920	770	800	680
Tensile strength at optimum (psi)	1050	1010	950	680
Elongation at optimum (%)	330	350	310	300
Hardness (Shore durometer)	70	70	73	75
Tensile after oxygen bomb aging (48 hrs. at 70° C. and 300 psi)	840	790	740	620
Change in tensile after aging	—18%	—22%	—22%	—10%

Extendex C is being studied on all types of synthetic rubber, and the results will be published in a later report.

Chicle and Jelutong

(*Continued from page* 136)

originated in Sarawak, is used in all the jelutong-producing regions, although with variations. The cuts are extended from time to time, and the upper cut approaches the vertical; while the lower cut tends to flatten out. A single laborer can tap between 25 and 30 trees daily, collecting from three to four gallons of latex.

Coagulation of the latex is done in the jungle. After straining, the latex is placed into the coagulating vessel which must be free of iron, and the coagulant is introduced. This may be kerosene, alum, or gypsum or a mixture of any of these; in Malaya the use of formic, acetic, and phosphoric acids has been developed. Alum is an excellent coagulant, but it has the disadvantage that refinement must be done within ten days. Phosphoric acid, now generally advocated by American manufacturers, is particularly advantageous as it precipitates any iron impurities. The more common method of coagulation is to leave the latex and coagulant standing for several days until coagulation is effected; the second method, which requires minutes instead of days, permits the mixture to boil until the process is complete. The refining of the crude jelutong consists in boiling the material in water to remove the soluble serum solids. Like chicle, jelutong is sold by weight and by water content, which is usually about 45%.

German Patents Relating to Vinyl Polymers—VI

M. Hoseh

PATENT (41)[1] gives a method for deaerating thermoplastic masses made of vinyl resins such as polyvinyl acetate. Plates, blocks, etc., made of this material are covered with an inert liquid and exposed in an autoclave to a temperature at which they do not lose their thermoplastic properties, e.g., 50 to 200° C. and a pressure of 2 to 50 atm. Should the thermoplastic yet contain traces of volatile substances, the liquid is so chosen that it acts as a solvent for these substances. For this purpose suitable liquids are water, alcohol, castor oil, as well as many other liquids which do not attack the plastic mass.

The preparation of readily soluble, technically valuable condensation products of polyvinyl alcohols are the subject of patent (42), whereby polyvinyl alcohols are condensed with ether-esters or diesters or their mixtures, derived from aldehyde hydrates which react with monomeric hydroxy compounds to form acetals or ester-ethers. Among such compounds suitable for this condensation are: monochlorodimethyl ether, mono-chloromethylbutyl ether, α-chloroethylbutyl ether, α-chlorodibutyl ether, α-chloroethylphenyl ether, ethyl-α-chlorobenzyl ether, α,β,β,β-tetrachlorodiethyl ether, etc. The condensation is conducted in a suitable solvent; care is taken to remove the acid which forms during the reaction. The reaction can be promoted by suitable catalysts. The properties of the product can be controlled by the choice of the polyvinyl alcohol and the ester-ether.

The polymerization of vinyl acetate in the presence of large quantities of water, contrary to previous practice, was found advantageous according to (43). Thus vinyl acetate emulsified in an equal amount of water containing 1% H_2O_2 is heated with constant stirring to 100° C. The polymer floats on the surface and is separated as a cake containing 10 to 30% water. The water is easily separated by pressing the mass through nozzles, or drying it and then grinding the dry mass in a hammer mill. The cost of production is thereby greatly reduced.

Opaque pearly or opal-like objects are obtained by the extrusion method from polyvinyl esters, e.g., polyvinyl acetate, which by themselves are clear, by mixing them with other transparent thermoplastics of vinyl polymers, e.g. polyvinyl chloroacetate or polystyrol, according to (44).[2]

This patent (45) describes a method for dyeing of water-insoluble plastics. According to it objects made from polymers of vinyl ethers, vinyl esters such as vinyl acetate and vinyl chloride, as well as acrylic acid esters and nitriles, etc., are suspended in an aqueous suspension of the dye and kept there until the right color is attained. The dyes used are insoluble or but slightly soluble in water. They are the dyes of aminoanthraquinone, nitroarylamines, aminoazo compounds, pyrozolones, diazotized aromatic bases, coupled oxyethylated aromatic amines, etc. In certain instances it is advisable to add to the dye bath dispersants such as Turkey red oil, alkylated naphthalene-sulphonic acid, polyethylene oxides, fatty alcohol sulphonates, molasses, sulphite waste, etc.

A rubber-polyvinyl mixture is described in the next patent (46). To obtain the mixture an aqueous suspension of a polyvinyl is added to latex, and the mixture coagulated with salts or an acid. Suitable polyvinyls are: polyvinyl chloride, acetate, benzoate, polyvinylmethyl ether, polyvinylalkyl ketone, polyacrylic nitrile, etc. The polyvinyls are dispersed with the aid of alkylated naphthalene-sulphonic acid, H_2SO_4 esters of higher aliphatic alcohols, salts of fatty acid chlorides and aliphatic aminosulphonic acids, etc. Depending on the relative amounts of the two components and the nature of the polyvinyl, the product will vary from the properties of elastic rubber to those of hard rubber. The product is worked like rubber and can be vulcanized.

Nitrogen containing polyvinyl derivatives are obtained according to (47) by treating polyvinyl alcoholate with cyanogen halide. Depending on the process chosen, the N content may vary from 0.1 to 6% or more. These compounds are used to affect the affinity of synthetic fibers for dyes.

The use of SO_2 as a promoter for the polymerization of vinyl ethers is the subject of patent (48).[3] SO_2 as a polymerization promoter is superior to many other catalysts, for the rate of the reaction can be regulated much easier, and the generated heat dissipated quickly. Another great advantage over the usually employed acid is that it enables the polymerization of basic vinyl ethers which cannot be done with acid catalysts. Thus with the use of SO_2 as a catalyst can be polymerized the vinyl ethers of oxyethylaniline, oxyethyl-m-chloroamine, oxyethyl-m-toluidine, 8-hydroxyquinoline, ethanolamine, etc.

Another method of obtaining polyvinyl derivatives containing N is given in patent (49). A polyvinyl alcoholate is acted upon by a haloalkylamine, e.g., bromoethylamine. These compounds have an affinity for acid dyes.

Mottled colored formed objects are prepared according to (50). By this method, differently colored polymerization products, such as polystyrols, its homologs and derivatives, polyvinyl acetate, polyvinyl chloride, derivatives of polyacrylic acid, etc., are ground to different-size particles and then heat-cast. The dyes are of such a nature that they remain unaffected by heat. Such inorganic substances as quartz, mica, asbestos, metallic powders, ultramarine, T_iO_2, etc., may be incorporated if desired.

Patent (51) describes an improved method for styrol polymers. According to it 100 parts of styrol, its homologs, or derivatives are polymerized with two to 10, but preferably five parts of acrylic acid esters. The products thus obtained are more elastic, tougher and more resistant to strain and stress. The styrols considered in this patent are methylstyrol and chlorostyrol. The acrylic acid esters are those of n-butyl, isobutyl, amyl, octyl, etc. The polymerization is conducted as usual.

A method of polymerizing compounds having a different rate of polymerization is described in (52). By this method two or more polymerizable compounds varying in their rate of polymerization are effectively polymerized together if the faster polymerizing compound is added in aliquots. A new aliquot is added when the preceding one is polymerized completely. The progress of the reaction is ascertained by determining either the solid matter content or the specific gravity of small samples taken from the reaction kettle.

A new and more readily available solvent for poly-

[1] For details on patents see end of article.
[2] Addition to 540,552 (41). See INDIA RUBBER WORLD, Nov. 1, 1941, p. 158.
[3] Addition to 524,189 (45). See INDIA RUBBER WORLD, Feb. 1, 1942, p. 471.

acrylic acid nitriles is the subject of (53), whereby the nitriles are dissolved in a concentrated solution of a metal salt, e.g., LiBr, $ZnCl_2$, etc. Particularly effective are thiocyanates. To the dissolved polyacrylic acid nitrile may be added polymeric carbohydrates, e.g., cellulose, polypeptides such as fibroin, as well as plasticizers, fillers, pigments, etc. Such solution is readily spun to thread and made into films, foils, etc. As a precipitating liquid, are used water, dilute salt solutions, etc.

A solvent for acrylic acid nitrile is described in (54). The nitriles are dissolved in liquid quaternary pyridinium bases. This new solvent for acrylic acid nitriles is obtained by the action of substituted alkyl halides on pyridine or its homologs. The nitrile solution thus obtained is used for making thread, films, etc.

The polymerization of acrylic acid esters is ordinarily a rather violent reaction. The addition of approximately 1% of unsaturated cyclic compounds of the terpene series, such as turpentine oil, colophony, etc., causes the reaction to proceed smoothly according to (55).

A novel, simplified method for the polymerization of styrols, indenes, vinyl esters, and other polymerizable organic compounds is described in (56). According to this method, the polymerization of the above-mentioned compounds is done as a continuous process without the use of a solvent or at least as little of it as possible. The end product, i.e., the polymer, is removed from the reaction vessel at the same rate as the monomer is fed into it so that the contact between the polymer and the monomer is reduced to a minimum. A suitable reaction vessel for this purpose is a tube, the inside of which is equipped with an endless screw. Catalysts, promoters, plasticizers, fillers, etc., can be added as usual. By adjusting the reaction conditions such as temperature, duration, etc., the properties of the product are regulated at will.

A process for producing rubber-like polymerization products from vinyl ethers is the subject of (57). The polymerization is conducted at low temperatures, e.g., –40° C., but the range of 0 to –80° C. can be used. For good results the ethers should be of a high degree of purity. This is readily attained by treating the starting compounds with metallic Na after their purification by distillation. The polymerization is achieved with the aid of volatile halides such as BF_3. A trace of this compound suffices to induce the desired polymerization. The low temperature is brought about by conducting the polymerization in liquid propane, liquid ethane to which is advantageously added solid CO_2, or even by using the latter alone. The halides used in the reaction are washed out from the product with water. For this purpose the product may be dissolved in a suitable solvent which does not mix with water. The polymers are rubber-like substances, but are more elastic than rubber. In hot water they soften, but return to their previous consistency when removed. The ethers can be polymerized with other substances which polymerize at the mentioned temperatures, e.g., isobutylene, diolefins, chlorodiolefins, acrylic acid compounds, vinyl ketones, styrol, etc. Also pigments and fillers such as carbon black may be incorporated. All these modify the final product to the intended degree.

Mixed polymerization of vinyl ethers with organic compounds having but one aliphatic double bond such as ethylene-α-β-dicarboxylic acid, its anhydrides, and derivatives is described in (58). Suitable vinyl ethers are primarily the ethers of the aliphatic alcohols, e.g., MeOH, EtOH, PrOH, and BuOH. Polyhydric alcohol-ethers too can be used, e.g., glycol ether; as well as the aromatic alcohols, such as benzyl ether, the hydro-aromatic alcohols, such as cyclohexyl ether, and the phenols. Among the organic compounds having one aliphatic double-bond are: vinyl chloride, vinyl acetate, vinylchloro acetate, styrol, acrylic acid nitrile, acrylic acid amide and anilide, or acrylic acid esters. The properties of the polymer is determined by the components. Thus styrol, vinyl chloride acrylic acid nitrile, and acrylic acid amide yield rigid products; whereas acrylic acid esters yield elastic, rubber-like products. The respective amounts of the components also determine the properties of the product. Depending on the properties of the polymers, they are used for making films, thread, coating materials, dope, and insulating materials, and mixed with the proper fillers and pigments the polymers are used for the manufacture of oilcloth, linoleum, leather substitutes, etc. Further, by saponifying the polymers produced with acrylic acid nitrile or acrylic acid chloride, are obtained water soluble products which are used as dispersants, emulsifiers, thickeners, binders, sizing, finishing materials, etc.

The use of polymerized aliphatic vinyl compounds in upholstery is described in (59). The polymer, singly or mixed, is dissolved in a suitable organic solvent, after which the solution may be dispersed in water. Suitable polymers for this purpose are polyvinyl acetate, polyvinyl methyl ether, polyvinyl-ethyl ether, etc. The solution of the polymer or its dispersion is sprayed on to the upholstery material such as animal hair, coconut fibers, kapok, Algerian grass, etc., or else the material is steeped in the solution or dispersion of the polymer. This treatment prevents the upholstering material from shifting once put in place.

A new and more effective catalyst for the polymerization of vinyl compounds is described in (60). This new catalyst is acetylbenzoyl peroxide, the formula of which is $CH_3 \cdot CO \cdot O \cdot O \cdot CO \cdot C_6H_5$. This catalyst acts instantaneously; only small quantities (0.15-0.3%) are needed, and its removal from the final product presents no difficulties. Another advantage of this catalyst is that it is cheaper to produce than the catalysts previously used.

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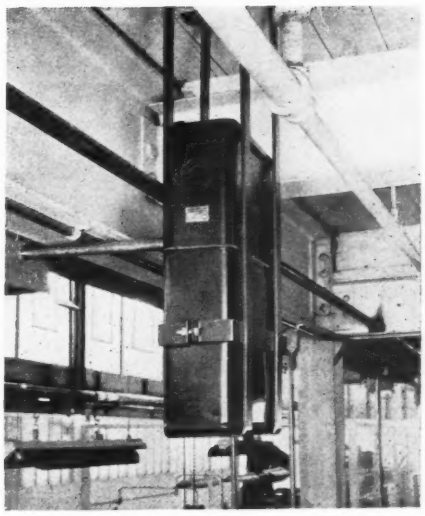
(To be continued)

Power-Factor Improvement

The Fastest and Most Economical Way to Increase Electrical Capacity in Your Plant . . . . . .

M. I. Alimansky and R. E. Insley[1]



G-E "Pyranol" Capacitor, 15 KVA, 440 Volts, Suspended from Ceiling in Bonded-Rubber-Products Plant of the Lord Mfg. Co., Erie, Pa.

IF WE were to ask a group of engineers, "What is power factor?", we probably would receive many different answers. Each person has his own practical conception of power-factor. One of the simplest and easiest to visualize is this one:

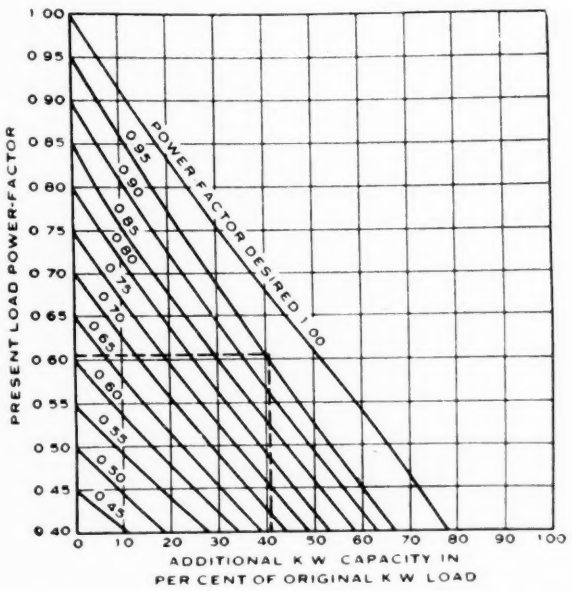
"Power-factor" is the electrical term used to denote the ratio of useful power current to the total supplied current in a circuit and can be best explained by two simple examples:

EXAMPLE 1: In an electric circuit supplying a load composed solely of incandescent lights, pressing irons, toasters, water heaters, or other equipment containing no electromagnets, 100% of the current supplied is used to produce heat, light, or other beneficial results. This circuit is said to have 100% power-factor.

EXAMPLE 2. However, if the circuit contains magnetic equipment, such as induction motors, transformers, electromagnets, etc., current must be supplied to energize these. This current, known as "magnetizing current" produces the magnetic field. Magnetizing current actually produces no useful power, but nevertheless is necessary for the proper functioning of the equipment. If the total current in a circuit were 100 amperes and the power current only 70 amperes, then the power-factor would be

$$\frac{70}{100} = .70 = 70\%$$

[1] With General Electric Co., Schenectady, N. Y.



Simplified Chart to Estimate Gain in Load-Carrying Capacity for Plant Power System

Why Do We Worry about Low Power-Factor?

The generation and distribution system which supplies the circuit of Example 2 must necessarily provide 100 amperes; whereas the actual power current required is only 70 amperes. This means that the electric system must be 100/70, or 143%, as large as that of Example 1 in order to provide the necessary magnetizing current.

Low power-factor then means that the existing generation, transmission, and distribution facilities of the power companies may be loaded to capacity, or even overloaded, from the standpoint of current, and yet underloaded from the standpoint of power being delivered. Since, for the same power delivered, low-power-factor loads impose a greater burden than high-power-factor, power companies have been allowed to introduce into their power contracts kva-demand and power-factor-adjustment clauses which impose an extra charge for low power-factor. Similarly, for industrials generating their own power, power-factor is extremely significant, since the power which can be drawn for production purposes is limited by the amount of generator capacity taken up by magnetizing current.

How Can We Improve Power-Factor?

If some device could be found which could be located near the apparatus requiring the magnetizing current, which device were capable of providing this magnetizing current locally, then it would be possible to eliminate the magnetizing current from the generator and feeders, thus

(*Continued on page* 145)

Reclaim Compounds with No Crude Rubber

H. C. Ghez[1]

THIS nation, faced now with an almost complete curtailment of crude rubber shipments from the Far East, must depend more and more upon reclaim as a source of rubber. The situation has become so critical that even reclaimed rubber use has been placed under sharp restriction.

In the past the American rubber manufacturer has regarded reclaim chiefly as a compounding material to be added to a rubber composition along with many other materials to bring about certain desired characteristics in the finished product at a desired cost. Now, however, the rubber manufacturer must consider reclaim as a source of rubber hydrocarbon. In many cases he will not be allowed to use any crude rubber and must resort to reclaim entirely.

Types of Reclaim

Today the rubber manufacturer has available many types of reclaim, with variations achieved through choice of the basic process, modification in the process, and the type of scrap rubber used. Over three-quarters of all reclaim produced is made by the alkali digestion process. But if sufficient scrap rubber is made available, it may become necessary to expand rapidly reclaim production.

In this expansion resort may be made to processes which do not require expensive equipment or long hours of processing. In this class are the "pan" or "heater" processes, and the more recently announced Nervastral processes. Nervastral reclaim can be made by the rubber manufacturer, using equipment that he already has installed for rubber goods manufacture. Specific mention is made below of two specific processes for making Nervastral.

Nervastral Processes

There are two distinct types of reclaiming by Nervastral processes: namely, LG and HG. In both cases the use of steam or pressure is unnecessary, and no washing or drying operations are used. By the use of these methods any rubber manufacturer can transform scrap rubber into reclaim for his own use.

In the LG process, scrap rubber containing fabric is used, as for example, whole tire reclaim. The tires are cut into large pieces and placed in an open vessel, together with a special organic liquid. The material is then heated for a period of one hour to two hours at about 200° C. in this vessel. After this treatment no washing or drying operations are necessary, and the reclaimed rubber can be mixed on a rubber mill or Banbury and subjected to the usual finishing operations, such as refining and straining. In this process the fabric undergoes a transformation, not into a carbonized powder or a hydrocellulose, but into a material that reenforces the finished reclaim. It is of importance to note that the recovery from this process is approximately 100% : there is no loss involved. Figures for elongation and tensile are given below.

The second process, HG, which produces a higher quality reclaim is applied to any type of scrap rubber that contains no fabric, e.g., tire peelings, tubes, and mold trimmings. The scrap is ground and mixed with certain chemicals that have an affinity for sulphur. The mixture is placed in an open vessel and heated at a very low temperature (about 100° C.) for only 20 minutes. After this operation, no washing or drying is required and the material can be handled as above by standard operations. Because of the low temperatures employed in the process, the reclaim retains much of the strength imparted to the original compound by reenforcing materials such as carbon black. Physical test data on reclaims made by this process are given below.

Two different formulas were used in testing the above processes, one with accelerator. The results at optimum cure were the same in all cases. The formulas follow.

With Accelerator

Reclaim	100
Sulphur	2
Zinc Oxide	3
Stearic Acid	1
Altax	0.7
	106.7

Optimum Cure=10 minutes @ 60 lbs. in all cases

Without Accelerator

Reclaim	100
Sulphur	5
	105

Optimum Cure=40 minutes @ 60 lbs. in all cases

Test Results

	Elongation %	Tensile Strength psi
Type LG (whole tire)	250-300	500- 600
Type HG (peelings)	350-400	1600-2000
Type HG (red tube, RRR)	450-500	1200-1500
Type HG (latex scrap)	600-650	2100-2200

By another process, developed in the Nervastral laboratories, it has been possible to produce reclaim from any type of scrap, which is soluble in any of the common rubber solvents to give a usable reclaimed rubber cement. Later in this article compounds with Nervastral reclaim are given, together with physical test data.

Advantages of the Nervastral processes for rubber manufacturers follow: (1) No important installation for depolymerization. (2) No installation for watering and washing. (3) No installation for drying. (4) Possibility of using idle Banbury mills in factories. (5) Possibility of more or less refining the product according to what one wants to make with a very real economy on the operating cost. (6) Possibility of disintegrating the fabric of the scrap to obtain a finished product wherein the fabric is incorporated in the mass. (7) Products of good quality can be made with these reclaims in soft, sponge, hard, sponge-hard rubber without the addition of crude rubber. (8) In the manufacture of sponge the cost price of working is lower than that of crude rubber sponge. (9) The operating cost of this reclaim is so low that it allows the manufacturer to have reclaim made with the proper scrap on the basis of 2¢ a pound.

General Principles of Compounding

In the change over to all-reclaim mixes the rubber manufacturer must keep in mind certain general principles. Of primary importance is to consider the choice of the proper type of reclaim for the intended application, bearing in mind that there is a wide variety of

[1] Rubber & Plastics Compound Co., Inc., 30 Rockefeller Plaza, New York, N. Y.

reclaim with wide variations in properties. In replacing crude rubber with reclaim, the replacement must be on the basis of the rubber hydrocarbon content. Consideration must be given also to the other materials present in the reclaim. Specific attention will now be given to the various compounding materials used in reclaim compounds.

Plasticizers

Many types of reclaim have to be plasticized before their use; others are plasticized too well. In each case the work of mixing can be done on cold or slightly warm rolls so that they will not be sticky. In the case of highly plasticized reclaim a doctor blade is used.

The duration of this preliminary milling varies according to the quality of the reclaim, but plasticizers are added only after the reclaim has banded on the mill. When the plasticizers are entirely absorbed, the accelerators are added, and then the fillers and finally the sulphur, if possible, always on cold rolls. The first economy in the cost of production is obtained by the saving in electric power for milling, which for reclaim is about 30% lower than in the case of crude rubber.

All stocks which are to undergo calendering and extruding must be plasticized to a greater extent. In the American market there are innumerable plasticizers belonging to well-defined classes: (1) bitumens and mineral rubber; (2) coal tar, pine oil, rosins, and coumarone resins; (3) mineral oils; (4) vulcanized oils; (5) stearic acid, palmitic acid, oleic acid, ricinoleic acid, and ricinoleates.

Mineral Rubber and Bitumens. Any type of bitumen can be used in plasticizing reclaim. The use of products having a low melting point must be limited to avoid having the mixes stick to the mill or calender rolls. A satisfactory bitumen is one having a melting point between 270° and 310° F. In this country such a product is widely used, and its use is advisable for many purposes.

For non-tacky reclaim 10% of bitumen is used and 2% to 3% for tacky material. In lampblack or carbon black stocks it is advisable that a portion of the mineral rubber or the plasticizer be added to the black in order to facilitate its dispersion on the mills.

In the manufacture of soles, mineral rubber is advantageously used to prevent cracking without impairing the abrasion resistance of the stock.

Coal Tar, Pine Oil, Rosins, Coumarones. Coal tar is an excellent plasticizer in reclaim stocks when its strong odor is of no importance in the finished product. Pine tar has less of an odor and is more agreeable. Both are employed within a limit of no more than 2% of the weight of the mix. Beyond this limit the mix becomes too tacky, especially if already loaded with mineral rubber.

Rosins and coumarones may be used in stocks requiring a certain degree of stiffness, often lacking in reclaim stocks. The incorporation of powdered forms is done usually before the addition of fillers. The tacky coumarones are added during mastication if the reclaim appears dry. Rosins and coumarones are employed in quantities of 2% to 4%.

Mineral Oils. There are available a number of pamphlets published by manufacturers of these products. We shall therefore limit ourselves to recommending that minerals oils should not be used in excess of 4% to 6%. However we point out that especially in the case of alkali reclaim, mineral oil does not produce tackiness.

Vulcanized Oils. In the reclaim mix, only brown vulcanized oils are employed. The white vulcanized oils are used chiefly in mixes which are used for spreading operations and subsequently cold cured.

Stearic Acid, Palmitic Acid, Oleic Acid. These materials do not have the same plasticizing action on reclaim as they have on rubber. Only stearic acid is generally employed as a dispersion agent for the accelerators, according to suggestions in the pamphlets. Cobalt linoleate, on the contrary, has a remarkable plasticizing action on reclaim mixes. In sponge rubber mixes a noticeable reduction in the plasticizing time has been observed.

Other Plasticizers. All other plasticizers used in rubber mixes can be employed in reclaim mixes without difficulty. It is very important to consider a vast number of such products in order to correct the plastic properties of the mix under manufacture without changing the qualities of the finished product.

Fillers, Sulphur, Accelerators, Etc.

Generally speaking, all of the fillers employed in rubber mixes can also be used in reclaim mixes. The fillers may be divided into two groups: (1) active fillers; and (2) inactive fillers.

Both groups are very important. The first group gives special properties to the compound; while the second lowers the cost. The more important active fillers: zinc oxide, lampblack, carbon black, magnesium carbonate, and litharge, are considered in detail below, together with some of the more important inactive fillers: whiting, clay, and chalk.

Zinc Oxide. When used in the proportion of 2% to 5%, zinc oxide is a very good acceleration activator. It also imparts to reclaim mixes the same relative degree of reenforcement as in the case of crude rubber compounds.

Lampblack. Its influence is less on reclaim than on rubber. At 20 to 25% by weight on the reclaim, lampblack increases the tensile strength, but the elongation diminishes more quickly. That is why it is employed only in very small percentages, with the exception of heel compounds, for instance, where stiffness is necessary.

Carbon Black. By adding the plasticizer during the incorporation of the carbon black a loading of 30 to 40% carbon black can be reached, giving excellent properties to the stock: higher tensile, higher resistance to tearing and abrasion, increase in stiffness, and reduction of elongation. It must be pointed out, however, that a percentage larger than 40% of carbon black diminishes the resistance to flex cracking. Such a mix is stiff when cold. When working with cold rolls, one must be careful; only small quantities must be used. To assure an easy flow in the mold it is necessary to cut the sheet according to the shape of the mold.

Magnesium Carbonate. This pigment, especially light magnesium carbonate, has practically the same properties as carbon black, but to a lower degree. It is preferably employed in light colored mixes (today almost prohibited for the lack of red inner tubes in the United States since the production of black tubes has begun) in the maximum proportion of 30 to 35% by weight on the reclaim.

Litharge. This filler, because of its calorific conductivity, is interesting in the manufacture of very thick articles (cylinder covers or special molded pieces). It can be used with most accelerators, and mercaptobenzothiazole is slightly activated by litharge. Usually sufficient is 2% to 3%, and a larger proportion would measurably increase the specific gravity of the mix. Litharge is used to a large extent in compounds for X-ray applications.

Whiting. In the manufacture of carpet underlay and molded articles which are not submitted to traction service or conditions of abrasion this filler is one of the best, although it does not offer good mechanical qualities.

Clay. This filler reduces, even if used in very small

quantities, the tensile and abrasion properties of reclaim mixes. It can easily be incorporated, and its not-too-high density is also suited for economical mixes.

CALCIUM CARBONATE. This material, which is used so much for insulated wire, is not so well suited as other fillers for reclaim compounds. It diminishes considerably the mechanical properties, and the compound has a tendency to slip on the rolls; the filler is absorbed with great difficulty. It is, however, employed in the manufacture of rubber stamps.

SPECIAL FILLERS. It is evident that cotton fibers, artificial silk, wood flour, asbestos, and cork powder as well as innumerable other fillers may give to reclaim the same properties they give to the crude rubber mixes. But an exception exists. Glue or other protein materials which act so effectively in crude rubber mixes do not influence reclaim mixes at all. We have proved this point on all existing types.

Ground rubber was introduced in reclaim compounds a long time ago in order to avoid the reclaiming of vulcanized scrap. A proportion of 100% by weight on the reclaim with the addition of 6% to 10% of suitable plasticizers (usually mineral rubber and mineral oils) results in a product with a satisfactory and sometimes even a surprising elongation. The ground rubber must be screened (30 to 40 mesh) to obtain an elongation of 225 to 250%. Obviously by adding ground rubber, depending upon the quality of the scrap, varying qualities can be obtained. The more uniform scrap as well as the cheapest type is made from peelings, found widely in America.

Hard rubber mixes can be filled with hard rubber dust without difficulty, giving hard ebonite, which is stiff enough to withstand polishing and which in most cases answers the requirements of hard rubber specifications.

SULPHUR. As in crude rubber mixes, a minimum quantity of sulphur can be used in reclaim compounds. In effect, with the thiurams the sulphur can be reduced to 0.6 to 0.7%, and with thiazols and aldehyde amines the sulphur content can be as low as 1.5 to 2% on the reclaim. A larger quantity of sulphur would diminish the tensile strength and abrasion resistance very greatly.

ACCELERATORS. Many different classes of accelerators can be used in reclaim compounding as indicated below.

Guanidines. As these accelerators act very slowly they are not of interest because in the manufacture of economical articles vulcanization must take place in short time in order to permit a low cost of production.

Aldehyde Amines. They impart better properties to the compound than the guanidines and give very satisfactory results when used with thiazols and thiurams (for example, 0.5% of each) and increase the elongation of the cured stock.

Thiazols. Mercaptobenzothiazole gives high modulus and good mechanical characteristics without the risk of scorching.

Thiurams. These are more delicate, but properly proportioned, give products of high quality.

ANTIOXIDANTS. The same products that are used in the rubber compounds can be adapted to reclaim compounds. The proportion of these products varies according to the other ingredients used, the active fillers, the sulphur, the time and the temperature of curing. The last-mentioned is fixed normally between 130 to 150° C. to avoid complications especially in removal of the product from the mold.

Practical Applications

A number of specially developed formulas for the use of 100% reclaim are given here with the hope that they will prove of use in eliminating crude rubber. Before using these formulas, they should be tested in the laboratory because the type of accelerator and the quality of the carbon black used will influence the result. But still more important is the effect of the type of reclaim used. Obviously alkali reclaim does not react in the same way as "pan" reclaim; thus tests are necessary. The following formulas contain varying proportions of reclaim of different quality, including Nervastral Type LG which is suitable for articles not to be subjected to a great deal of flexing, and Type HG for items such as soles, sandals, tread, etc. The use of the two reclaims or the use of these two combined with alkali reclaim can sometimes be advantageous as indicated in the compounds given below.

Heel and Sole of Good Quality

Nervastral reclaim Type HG	100
Peeling scrap 30-mesh screen	20
Mineral rubber 280° F.	4
Pine tar	2
Micronex	10
Furnex	40
Zinc oxide	5
Stearic acid	1
Sulphur	1.5
Altax	1
Vulcafor RN	0.5
Agerite Resin	1.5
	186.5

Cure: 15 min. at 60 lbs.
Spec. gravity: 1.35
Shore hardness: 83
Tensile: 1,350 psi
Elongation: 185%

This mix can be hardened to a greater extent as might be desired in certain types of heels by replacing part of the Furnex with Micronex.

Carpet or Gasket

Nervastral reclaim Type HG	50
Nervastral reclaim Type LG	50
Peeling scrap 15-mesh	30
Mineral rubber 312° F.	2
Pine tar	5
Whiting	100
Furnex	20
Zinc oxide	5
Stearic acid	1
Sulphur	1
Vulcafor RN	0.8
Captax	0.7
Agerite Resin	1.2
	266.7

Cure: 15 min. at 60 lbs.
Spec. gravity: 1.59
Shore hardness: 82
Tensile: 560 psi
Elongation: 100%

Bicycle Tread

Alkali reclaim	100
Peeling auto tire 30-mesh	15
Vulcanized oil	5
Mineral rubber	4
Furnex	15
Zinc oxide	5
Stearic acid	1
Sulphur	1
Vulcafor RN	0.2
Altax	0.5
Agerite Resin	1.5
	148.2

Cure: 10 min. at 60 lbs.
Spec. gravity: 1.25
Shore hardness: 63
Tensile: 980 psi
Elongation: 340%

Rubber Sole for Rubber Shoes

Alkali reclaim	50
Nervastral reclaim Type LG	50
Mineral rubber	5
Lampblack	25
Zinc oxide	5
Litharge	1
Stearic acid	1
Sulphur	1
Mercaptobenzothiazole	1
Agerite Resin	1.5
	140.5

Cure: 35 min. at 60 lbs. air pressure in autoclave
Spec. gravity: 1.30

Rubberized Fabric for Shoes

Nervastral reclaim Type HG	25
Nervastral reclaim Type LG	75
Vulcanized oil	20
Furnex	10
Litharge	3
Zinc oxide	5
Stearic acid	1
Sulphur	1.3
Altax	1.2
Agerite Resin	1.5
	143.0

Cure: in open air 25 min. ot 130° C.
in open steam 20 min. at 50 lbs.
Spec. gravity: 1.32

Nervastral reclaims can be loaded heavily with vegetable fillers such as wood floor and cork as in the following example.

Inner Sole for Shoes

Nervastral reclaim Type RRR	100
Ground inner tubes	10
Vulcanized oil	5
Cork	30
Stearic acid	2
Zinc oxide	5
Sulphur	1.5
Altax	1
Vulcafor RN	0.3
Agerite Resin	1.5
Sodium bicarbonate	1
	157.3

Cure: in autoclave 20 min. at 60 lbs.

Sodium bicarbonate can be replaced by ammonium bicarbonate and can be increased or decreased in quantity according to the degree of porosity that is desired in the inner sole.

Red Sandal

Nervastral reclaim Type RRR	100
Ground rubber red	50
Mineral oil	1
Stearic acid	1
Barium sulphate	25
Zinc oxide	5
Titanox	2
Sulphur	1
Altax	1
Tuads	0.2
Agerite Resin	1
	187.2

Cure: 10 min. at 60 lbs.
Spec. gravity: 1.48
Shore hardness: 50
Tensile: 950 psi
Elongation: 450%

Ten per cent. to 15% of the ground scrap for manufacturing can also be added, without impairing the quality.

Insulated Wire

Nervastral reclaim Type HG	50
Nervastral reclaim Type LG	50
Vulcanized oil	5
Furnex	10
Whiting	50
Zinc oxide	5
Stearic acid	1
Sulphur	1
Vulcafor RN	0.5
Altax	0.5
Agerite Resin	1.5
	174.5

Cure: 20 min. at 60 lbs.
Spec. gravity: 1.40
Shore hardness: 72
Tensile: 500 psi
Elongation: 220%

The elimination of crude rubber by the use of all-reclaim compounds will render a distinct service to the nation.

Each manufacturer can do a great deal in this work; and he should remember that each ounce of rubber saved is so much accomplished toward bringing us closer to victory.

Zinc Oxide Sales Up

Purchases of zinc oxide by rubber manufacturers last year were the largest recorded, according to the Bureau of Mines, U. S. Department of the Interior. Figures showing distribution of sales by uses are available for the period of 1929 to 1941 only, but the report indicated that the 90,429 short tons bought by the rubber industry in 1941 was considerably higher than ever before. Such sales in 1940 were 70,979 short tons; in 1938, 46,266 short tons. In 1941, 145,865 short tons of zinc oxide were produced, and sales totaled 148,833 short tons, value $18,558,474.

Power-Factor Improvement

(*Continued from page* 141)

releasing system capacity for additional power load. Fortunately such a device does exist; it is called a capacitor. It is obtainable in many voltage and current ratings to fit the particular application. When such a capacitor is installed in the electrical system which previously had a low power-factor, the power-factor is improved, and the system operates more efficiently and inexpensively.

Where and How Should Capacitors Be Applied?

Means for improving power-factor should be applied at the source of trouble. Capacitors connected on circuits with low power-factor reduce the current between the point where they are connected and the source of supply. Therefore it is imperative that they be installed at or near the terminals of the machine drawing the magnetizing current.

In selecting capacitors it is possible to work out the optimum value of capacitor rating mathematically, but these calculations are laborious, especially when a number of cases are to be computed. "Short-cut" methods have been devised, as shown in the simplified chart.

In using the chart, draw a horizontal line from point at left representing power-factor. This line will intersect curve representing desired new power-factor. From point of intersection, draw a vertical line to base of chart and read the per cent. of new load which your power system can carry after installation of capacitors.

Example (dotted line): Suppose present power-factor of a 100-kva load is 60% and desired power-factor 95%. Projection of intersection of 60% power-factor line with 95% power-factor curve shows that 41% *new* load can be carried after power-factor improvement. This is, 41 kva of new load can be added to present system.

Conclusion

In many industrial plants, existing circuits, transformers, and switching equipment can be made to carry additional power load by the application of capacitors to improve power-factor. This is especially valuable under present conditions since capacitors are flexible, inexpensive, and obtainable in relatively short time.

Condensed Table Showing How New Load Can Be Added after Power-Factor Improvement

Original Power-Factor	New Load That Can Be Added in Per Cent. of Present Load with Power-Factor Improved to: 90%	95%	100%
60%	35.8	41	51.5
65%	29	35	44
70%	23	28.5	37
75%	17	22.5	30

Amendments to Supplementary Order No. M-15-b-1 to Restrict the Use and Sale of Rubber[1]

No. 3

SECTION 940.5 (Supplementary Order No. M-15-b-1) is hereby amended as follows:

1. By adding the following to subdivision (b) of List 7 attached thereto, and also to subdivision (b) of List 9 attached thereto:

All compounded rubber in a tire, other than the tread and sidewalls is considered as "friction", and the tread and sidewalls are considered "tread." Each tire manufacturer should adopt minimum gages or thicknesses in the following parts of all tires: sidewalls (but within the above specifications); plys and squeegees; under-tread (but within the above specifications); cushions and breakers. "Minimum" as used herein means the thinnest gage which the manufacturer believes can be used without materially detracting from the performance of the tire.

Any manufacturer who can use subtreads, or who can apply sidewalls separate from the tread, and who can in either of these ways save Rubber without detracting materially from the performance of the tire should do so, even if it requires the use of slightly more reclaimed rubber. The total amount of Rubber and reclaimed rubber which a manufacturer may use if he uses subtreads or sidewalls to save Rubber is the amount calculated in accordance with the appropriate friction and tread formulas, less the amount which may be saved through the use of subtreads and/or sidewalls.

Each tire manufacturer shall as soon as practicable after entering into the production of tires under the formulas prescribed above, but not later than April 30, 1942, submit to the Rubber and Rubber Products Branch a report on a form to be prescribed.

2. By changing subdivision (c) of List 7 attached thereto to read as follows:

(c) *Capping stock and camelback.*

(1) Capping stock may be manufactured only in gages of 10/32, 12/32, 14/32, 16/32, 18/32, 20/32, 22/32 inch and larger.

(2) Camelback may be manufactured only in gages 18/32, 20/32, 22/32 inch and larger only by special permission from the War Production Board.

(3) Capping stock and camelback in gages of 18/32-inch and larger when required for recapping truck and bus tires and for retreading special purpose tires, shall be manufactured only from Compounds of Grade C.

(4) Capping stock gages of 16/32 in. and smaller for recapping tires for trucks and buses shall be manufactured only from compounds of Grade C.

(5) Capping stock for recapping passenger-car tires shall be made only from compounds of Grade F, and only in gages of 10/32, 12/32, 14/32, and 16/32 of an inch. Such capping stock may be faced with cushion stock of any of the gages listed below; provided that cushion stock of any such gage shall not contain more Rubber by weight than the percentages set forth opposite such gage.

Gage—Inch	Percentage of Rubber
.012	54
.013	51
.014	48
.015	45
.016	42
.017	39
.018	36

3. By inserting the following new subparagraphs immediately after subparagraph (b)(12) thereof:

(13) Hospital sheeting — List 13
(14) Miscellaneous articles to fill Army Orders — List 14

4. By attaching thereto the attached additional Lists 13 and 14.

This Order and the specifications set forth in the lists attached hereto shall take effect as of the date of the issuance of this Order.

Issued this 3rd day of April, 1942.

J. S. KNOWLSON
Director of Industry Operations

Supplementary Order No. M-15-b-1 as Amended

LIST 13

Specifications for the manufacture of hospital sheeting.

(1) The color shall be black or maroon only.
(2) The thickness shall be .020-inch plus or minus .002-inch.
(3) The width shall be 36 inches plus or minus one inch.
(4) The compound shall contain not more than 20% Rubber by weight.
(5) The weight of the compound shall not exceed 17 ounces per square yard.

Supplementary Order No. M-15-b-1 as Amended

LIST 14

No Rubber (as defined in paragraph (a)(1) of Supplementary Order No. M-15-b as amended) shall be used in the manufacture of any of the following articles for delivery to or for the account of the United States Army, even though the use of Rubber therein may be called for by the Army purchase orders or the Army specifications.

Ash trays
Bath trays, sponges, and soap dishes
Bumper stripping
Buttons
Cap covers
Channel filler
Chemically blown sponge products
Cowl vent seal sponges
Dish drainers
Door checks and bumpers
Escalator handrails
Flooring, (except conductive flooring)
Fly paper
Fly swatters
Foot-bath trays
Friction tape
Furniture upholstery and cushions
Gun grips
Gym and basketball shoes
Handle grips
Heel bases
Heels
Hospital sheeting and pillow and mattress covers
Kneeling pads
Labels
Mallet heads
Mats and matting (except conductive mats and matting)
Molded wheels and casters
Name plates
Pedal rubbers
Plate wipers
Raincoat fabric
Recoil pads
Rubber bands
Rubber-covered lamp-guards, handles grabrails and knobs
Rubber-set brushes
Seal sponge
Serving trays
Sewage disposal bags and paper
Sink stoppers
Sponge crash pads
Telephone bases
Thermostat covers
Tile and tiling
Toilet seats
Typewriter keys
Wainscoting
Water hose
Weatherstrip
Wrestling mat covers

No. 4

Section 940.5 (Supplementary Order No. M-15-b-1) is hereby amended by changing the period at the end of subdivision (8) of List 12 attached thereto to a semi-colon (;) and inserting immediately thereafter the following:

"provided that the new provisions of this subdivision (8) shall not become effective until May 1, 1942."

This Order shall become effective as of its date of issuance.

Issued this 11th day of April, 1942.

J. S. KNOWLSON
Director of Industry Operations

[1] Title 32—National Defense, Chapter IX—War Production Board, Subchapter B—Division of Industry Operations, Part 940—Rubber and Products and Materials of Which Rubber Is a Component.

Deodorants for Reclaim

Three deodorants for modifying the odor of reclaimed rubber to make it suitable for druggists' sundries and household articles have been developed in the laboratories of Givaudan-Delawanna, Inc. Notwithstanding the reduction in the number of available aromatic materials in the past six months, these deodorants are claimed to be economical, lasting in effectiveness, and sufficiently non-volatile for use in usual cures. They are said to impart a neutral odor to the compound.

Amendments to Supplementary Order No. M-15-b to Restrict the Use and Sale of Rubber[1]

No. 7

SUPPLEMENTARY Order No. M-15-b is hereby amended by substituting the attached lists designated A, B, C, and D for Lists A, B, C, and D respectively, now attached to such Order.

This Order shall take effect on April 1, 1942.

Issued this 30th day of March, 1942.

J. S. KNOWLSON
Director of Industry Operations

LIST A (REVISED, EFFECTIVE APRIL 1, 1942) TO SUPPLEMENTARY ORDER NO. M-15-B AS AMENDED

Group 1 ..... 100%
- Concentrator belts
- Industrial brake linings and clutch facings
- Polishing belts
- Screen diaphragms

Group 2 ..... 80%
- Cleats and bucket pads
- Last puller belts
- Pulley lagging
- Round belts
- Street sweeper belts

Group 3 ..... 100%
- Acid hose
- Cement gun hose
- Chemical hose
- Grease gun hose
- Hydraulic control hose
- Jetting and hydraulic hose
- Railroad hose (all types)
- Rotary drillers' hose
- Sand blast hose

Group 4 ..... 100%
- Air drill hose
- Dredging sleeves
- Industrial vacuum hose
- Oil suction and discharge hose
- Pneumatic hose
- Spray hose (for working pressures of 300 lbs per sq. in. and over)
- Paint spray hose
- Steam hose
- Suction hose
- Welding hose
- Gasoline and oil tank wagon hose (not including curb pump hose)
- Sanitary hose

Group 5 ..... 30%
- Fire and mill hose

Group 6 ..... 85%
- Hard rubber pipe and fittings
- Rubber buckets, pails, dipper, funnels, measures, bottles, beakers, frames, baskets, racks, trays (for handling corrosive materials and explosives)
- Rubber-insulated fume-ducts, fans, racks, frames, trays, screens, pipe, buckets, pails, dippers, agitators, funnels and measures (for handling corrosive materials and explosives)
- Rubber pumps, blower, exhauster and pump lining, valves and parts

Group 7 ..... 80%
- Storage battery parts (including only separators, retainers, binding strips, element support rods, tie rods, and plate support rods, and hand-built jars and containers, excepting those for automotive starting and lighting batteries)
- Hard rubber sheets, rods, and tubing (for dielectric purposes)
- Molded cable connectors and terminal blocks (for dielectric purposes)
- Insulated tools
- Magneto parts

Group 8 ..... 100%
- Mine safety battery parts
- Mine safety lamp parts
- Respirators, hose masks, gas masks, goggles, inhalators, (mining and industrial types)

Group 9 ..... 80%
- Chute lining (including lining for sandblast chambers)
- Oil well specialties (packers, testing, lining, bumper and swab rubbers, blow-out preventers, drill pipe protectors, stabilizers, slush pump pistons and liners, mud and oil pump pistons, liners, valves, and parts, valve cups, strippers, stuffing box rings)
- Sheet, strip and mechanical packings
- Vibration dampers (non-automotive)

Group 10 ..... 100%
- Airplane deicer parts
- Card clothing
- Gaskets and washers (not elsewhere listed) necessary for use with products in lists A, B, C, and D
- Gas main bags
- Linemen's protective devices (line hose, insulator hoods, blankets, cable end test caps and separators, cable bandages, linemen's sleeves, and insulating stools)
- Locomotive drive units
- Spinning cots
- Mine ventilating tubing
- Molded, extruded, and lathe-cut goods and tubing (not elsewhere listed), constituting component parts of machinery for the processing and fabrication of raw and semi-finished materials and for the transmission of mechanical power
- Pipe coupling rings
- Pipe lining disks
- Shoe diaphragms
- Stuff pump balls
- Molded seals for dam and lock gates

Group 11 ..... 80%
- Fingerprint rolls and fingerprint rubber
- Cutting rubbers
- Offset and newspaper blankets
- Printing plates (including cements, but excluding rubber stamps, box dies, band daters, and toy stamps)
- Printers' rollers
- Suction cups for printers' equipment
- Rubber solution for wet plate negatives

Group 12 ..... 40%
- Engravers' rubber (including necessary cements, but excluding rubber stamps, box dies, band daters, and toy stamps)

Group 13 ..... 140%
- Milk and milking machine equipment, consisting of:
  - Couplings for pasteurizers and milk bottle and can washers
  - Gaskets for milk separators and clarifiers
  - Milk bottle filler rubbers
  - Milking machine inflations and tubing

Group 14 ..... 160%
- Abrasive implements

Group 15 ..... 50%
- Automotive parts, consisting of the following:
  - Hydraulic brake cylinder parts, excepting boots
  - Hydraulic brake hose
  - Air brake and vacuum brake parts, excepting boots
  - Air brake and vacuum brake hose
  - Torsional vibration dampers
  - Clutch facings, brake linings, and brake blocks
  - Shock absorber bushings
  - Steering post alinement bushings
  - Pitman arm bushings for independent suspensions
  - Steering box-to-frame pads for independent suspensions
  - Windshield wiper blades and pivot to housing gaskets
  - Suspension and torque arm bushings
  - Engine, transmission, and propeller center bearing mountings
  - Remote control gearshift bushings
  - Spring bumpers—front and rear
  - Cements and tie-gums (for bonding rubber to metal only)
  - Sealed beam gaskets
  - Hydraulic clutch and throttle controls

Group 16 ..... 20%
- Automotive fan belts (for trucks, buses, tractors, and farm implements)

Group 17 ..... 70%
- Flush valve balls
- Washers, including fuller balls and diaphragms, for controlling the flow of fluids
- Water meter parts

Group 18 ..... 20%
- Autopsy and mortuary gloves
- Net-lined and all-rubber gloves (for handling corrosive and severely abrasive materials)

Group 19 ..... 100%
- Electricians' gloves (seconds to be used for handling corrosive and severely abrasive materials)

Group 20 ..... 100%
- Blood pressure bags
- Brain surgery caps
- Colostomy outfits
- Dental separating strips and mouth props
- Dilators
- Finger cots (medical, surgical, dental, veterinary, and laboratory)
- Inhalation bags and face pieces (medical, surgical, dental, and veterinary)
- Invalid rings
- Operating cushions
- Othodontia bands
- Parts of medical, surgical, dental, veterinary, and mortuary instruments
- Prostatic bags
- Rubber bands and cushions for artificial limbs
- Rubber denture, denture suctions, and model formers
- Tourniquets
- Tubes, tubing, including catheters, stopples, and rubber policemen, (medical, surgical, dental, mortuary, veterinary, and laboratory)
- Umbilical belts
- Urinal—individual wear
- Vaccine caps
- X-ray sheets, gloves, aprons, and cooling hose

Group 21 ..... 85%
- Surgical tape, medicated footpads and plasters

Group 22 ..... 50%
- Breast pumps
- Bulbs (medical, surgical, dental, mortuary, veterinary, and laboratory)
- Water bottles and combination syringes
- Medicine droppers

[1] Title 32—National Defense, Chapter IX—War Production Board, Subchapter B—Division of Industry Operations. Part 940—Rubber and Products and Materials of Which Rubber Is a Component.

Group 23 ..... 50%
Hospital sheeting (hospital, ambulance, mortuary, and first-aid use only)
Ice bags
Metatarsal cushion or pad (not part of shoe)
Truss pad covers
Self-adhering gauze bandages
Pneumatic truss pads

LIST B (REVISED, EFFECTIVE APRIL 1, 1942) TO SUPPLEMENTARY ORDER NO. M-15-B AS AMENDED

Group 1
Compounds for insulating wire and cable
Group 2
Cable splicing compound (including necessary cement)
Group 3
Conveyer and elevator belting
Group 4
Belt splicing and repair material
Group 5
V-belts (non-automotive)
Group 6
Flat transmission belts
Hog-beater belts
Group 7
Rubber-lined tanks, drums, pipes and fittings (hard and soft)
Group 8
Rubber-covered rolls and roll coverings (except domestic washing machine wringer, printers', fingerprint, and business machines)
Group 9
Press die pads
Group 10
Loom pickers
Group 11
Pneumatic, solid, and cushion tires and tubes (including flaps, cements, airbags, and valves) of the following types:
Passenger tires and tubes
Truck and bus tires
Truck and bus tubes
Special purpose (including earthmover, road grader, and excavator) tires and tubes
Industrial tires and tubes (power-driven vehicles only)
Farm tractor tires and tubes
Motorcycle tires and tubes
Bicycle tires and tubes
Airplane tires and tubes
Group 12
Camelback, capping stock, filler strip, striping stock, cushion stock, lug stocks, and base stock for retreading and recapping tires
Group 13
Full-circle airbags and cements for recapping and retreading tires
Group 14
Vulcanizing materials, patches, blowout shoes, sectional airbags, cements, and similar items for the repair of tires and tubes
Group 15
Thread for:
Edging
Industrial shoes, belting, and flexible metallic hose
Repair cords and webs
Sanitary belts
Supporters (men's athletic)
Surgical elastic bandage
Surgical stockings
Surgical supports for abdomen, back, and breast
Suspensories
Trusses (including umbilical belts)
Webbing for respirators, hose masks, gas masks, and inhalaters
Group 16
Container sealing compounds
Sealing gaskets (cut rings for commercial packaging)
Group 17
Commercial diving equipment
Group 18
Rubberized fabric for heating pads
Group 19
Rubberized fabric for firemen's and policemen's clothing and occupational protective clothing, other than footwear and gloves, consisting of industrial pants, coats, jackets, hose, and aprons.
Group 20
Rubber footwear for severe industrial use including rubber boots, mine pacs, and work shoes with plain or steel toes
Group 21
Rubber footwear, other than that provided in Group 20, including rubber boots, pacs, arctics, gaiters, overshoes, rubbers
Group 22
Nipples (feeding)
Group 23
Pessaries and prophylactics
Group 24
Surgeons' gloves (medical, surgical, dental, and veterinary use)
Group 25
Shoe adhesives for the following operations only:
Cutting and fitting room operations
Bed and side lasting
Folding
Gem duck
Heel breasting
Insole rib and lip
Moccasin seam
Prewelt
Platform attaching
Rand
Soft box toe
Sole and bottom attaching
Semi-automatic toe lasting
Unishank
Leather welting
Repair
Group 26
Meteorological balloons
Group 27
Box die gum, rubber die gum, and rubber type gum, all for industrial marking devices only

LIST C (REVISED, EFFECTIVE APRIL 1, 1942) TO SUPPLEMENTARY ORDER NO. M-15-B AS AMENDED

Group 1 ..... 100%
Colostomy outfits
Finger cots (medical, surgical, dental, mortuary, and veterinary use)
Prostatic bags
Tubes, tubing, including catheters (medical, surgical, dental, mortuary veterinary, and laboratory use)
Urinals, individual wear
Group 2 ..... 50%
Inhalation bags and face pieces (medical, surgical, dental, laboratory, and veterinary)
Operating cushions
Veterinary sleeves
Group 3 ..... 75%
Flat belts
Round belts
Group 4 ..... 15%
Latex insulation for fume ducts, fans, racks, frames, trays, screens, pipes and fittings, buckets, dippers, funnels, measures, drums, pumps, valves, baskets and agitators (for handling corrosive material)
Group 5 ..... 20%
Industrial rubberized fabric gloves for handling corrosive materials
Group 6 ..... 100%
Electricians' gloves (seconds to be used for handling corrosive and severely abrasive materials)
Group 7 ..... 20%
Industrial all-rubber and net-lined gloves, (for handling corrosive and severely abrasive materials)
Autopsy and mortuary gloves

LIST D (REVISED, EFFECTIVE APRIL 1, 1942) TO SUPPLEMENTARY ORDER NO. M-15-B AS AMENDED

Group 1
Container sealing compounds
Group 2
Meteorological balloons
Group 3
Nipples (feeding)
Group 4
Pessaries and prophylactics
Group 5
Surgeons' gloves (medical, surgical, dental, and veterinary use)
Group 6
Shoe adhesive for the following operations only:
Cutting and fitting room operations
Bed and side lasting
Folding
Gem duck
Heel breasting
Insole rib and lip
Moccasin seam
Prewelt
Platform attaching
Rand
Soft box toe
Sole and bottom attaching
Semi-automatic toe lasting
Unishank
Leather welting
Group 7
V-belts (non-automotive)

No. 8

Sec. 940.3 (Supplementary Order No. M-15-b) is hereby amended as follows:

1. By striking out all of Group 14 of List B (as revised effective April 1, 1942) attached thereto and substituting therefore the following:

Group 14
Cushion gum stock, tread stock, tire dough, cord fabric, sectional air bags, repair patches, and cements for the repair of tires and tubes.

2. By inserting at the end of List F attached thereto the following:

Group 14
Tire reliners (except those cut from used or scrap tires or tubes)

This Order shall take effect as of the date of its issuance.

Issued this 11th day of April, 1942.

J. S. KNOWLSON
Director of Industry Operations

Removal Notice. On and after May 1, 1942, the offices of INDIA RUBBER WORLD and all other Bill Brothers publications will be located on the fourth floor of 386 Fourth Ave., New York, N. Y. The telephone number remains unchanged—MOhawk 4-1760.

Conservation Order M-119[1]

THE fulfillment of requirements for the defense of the United States has created a shortage in the supply of rubber for defense, for private account, and for export; and the following Order is deemed necessary and appropriate in the public interest and to promote the national defense:

1164 CONSERVATION ORDER M-119

(a) *Definitions.* For the purposes of this Order:

1. "Person" means any individual, partnership, association, business trust, corporation, governmental corporation or agency, or any organized group of persons, whether incorporated or not.
2. "Glass Container" means any bottle, jar, or tumbler, made of glass, which is intended for packing, packaging, or putting up products of any kind for sale.
3. "Rubber Sealed Closure" means any covering device for retaining the contents within a Glass Container which Closure is affixed or sealed to the Container by any rubber product or rubber compound, whether such rubber medium be incorporated into the Closure, or be used in conjunction with the Closure, as is illustrated by a separate rubber sealing ring.

(b) *Restrictions upon Manufacture, Sale, and Delivery.*

1. Beginning ten days after the effective date of this Order, no person shall buy, accept delivery of, or use any rubber product or rubber compound for the manufacture of Rubber Sealed Closures for Glass Containers intended to be used for the packing of any product listed upon Table 1, annexed to this Order, or any other product which the Director of Industry Operations may hereafter designate from time to time by Supplementary Order.
2. Beginning ten days after the effective date of this Order, no person who manufactures Rubber Sealed Closures for Glass Containers shall sell or deliver to any purchaser any Rubber Sealed Closures for Glass Containers, unless the purchase order or contract therefor be validated by the purchaser's certification to the seller, endorsed upon the order or contract in substantially the form set forth in Exhibit "A", attached to this Order. The endorsement shall state that the purchaser is familiar with the terms of this Order (in its present form or as it may be amended from time to time) and that during the life of this Order, he will not use any Rubber Sealed Closures purchased from the seller in violation of its terms. Only one such endorsed certification, covering all present and future purchases from a given seller need be furnished by any purchaser to that seller, but no seller shall be entitled to rely on any such certification if he knows, or has reason to believe it to be false.
3. Each person who manufactures such Rubber Sealed Closures for Glass Containers shall file such reports as the War Production Board may prescribe for the purpose of affective administration of this Order.

(c) *Restrictions upon Purchase, Acceptance of Delivery, and Use.*

Beginning thirty days after the effective date of this Order, no Person shall buy, accept delivery of, or use any Rubber Sealed Closures for sealing Glass Containers which shall be packed with any product listed upon Table 1, annexed to this Order, or any other product which the Director of Industry Operations may hereafter designate from time to time by Supplementary Order, provided that this Order shall not prevent the purchase, acceptance of delivery, or use, for packing such products in Glass Containers of such Rubber Sealed Closures which were completely manufactured on or before the effective date of this Order, or within ten days thereafter, and which cannot be used for another product because of special formula, decoration, or packer's label upon the Closure.

(d) *Exception.*

This Order shall not apply to the manufacture, sale and delivery, or the purchase, acceptance of delivery, and use of Rubber Sealed Closures for sealing Glass Containers which are to be delivered, pursuant to a purchase order or contract, to any foreign country pursuant to the Act of March 11, 1941, entitled "An Act to Promote the Defense of the United States (Lend-Lease Act), to the Army or Navy of the United States, or to such other Governmental Agency as the Director of Industry Operations may designate.

(e) *Miscellaneous Provisions.*

(1) *Applicability of Priorities Regulation No. 1.* This Order and all transactions affected thereby are subject to the provisions of Priorities Regulation No. 1 (Part 944) as amended from time to time, except to the extent that any provision hereof may be inconsistent therewith, in which case the provisions of this Order shall govern.

(2) *Records.* All persons affected by this Order shall keep and preserve for not less than two years accurate and complete records concerning inventories, production, and sales.

(3) *Audit and Inspection.* All records required to be kept by this Order shall, upon request, be submitted to audit and inspection by duly authorized representatives of the War Production Board.

(4) *Violations or False Statements.* Any person who wilfully violates any provision of this Order, or who by any act or omission falsifies records to be kept or information to be furnished pursuant to this Order may be prohibited from receiving further deliveries of any material subject to allocation, and such further action may be taken as is deemed appropriate, including a recommendation for prosecution under Section 35(A) of the Criminal Code (18 U. S. C. 80).

(5) *Appeal.* Any Person affected by this Order who considers that compliance therewith would work an exceptional and unreasonable hardship upon him, or that it would result in a degree of unemployment which would be unreasonably disproportionate compared with the amount of Rubber conserved, or that compliance with this Order would disrupt or impair a program of conversion from non-defense work, may appeal to the War Production Board by letter or other written communication, setting forth the pertinent facts and the reason he considers he is entitled to relief. The Director of Industry Operations may thereupon take such action as he deems appropriate.

(6) *Communications.* All reports required to be filed hereunder and all communications concerning this Order shall, unless otherwise directed, be addressed to:

"War Production Board
Washington, D. C. Ref: M-119"

(7) *Effective Date.* This Order shall take effect upon the date of the issuance thereof and shall continue in effect until revoked by the Director of Industry Operations subject to such amendments or supplements thereto as may be issued from time to time by the Director of Industry Operations.

Issued this 9th day of April, 1942.

J. S. KNOWLSON
Director of Industry Operations

TABLE 1

Animal Food
Beefsteak Sauce
Candied Fruits
Candy
Chili Peppers
Chow Chow
Chutney
Citron Peel
Cocoa Powder
Coffee
Corn-on-the-Cob
Flavoring Extract
Greens, including Spinach, Turnips, etc.
Honey
Macaroni
Marshmallow Topping
Mayonnoise
Nuts
Peanut Butter
Piccalilli
Pickles, except home style processed
Pickled Mangoes
Pickled Relishes
Pickled Sauces
Potato Products of all kinds
Powdered Skim Milk
Salad Dressing
Sandwich Spread, not including Meat Spreads
Shortening
Soups and Chowders
Spaghetti
Spices
Sweet Potatoes
Syrups, including only Corn, Cane, Maple, Molasses and Sorghum
Tea
Tobacco
Turnips
Vinegar
Whole Apricots
Whole Carrots
Whole Pears

[1] Title 32—National Defense, Chapter IX—War Production Board, Subchapter B—Division of Industry Operations. Part 1164 Rubber Sealed Closures for Glass Containers.

EXHIBIT "A"

Endorsement

The undersigned purchaser hereby certifies to the seller herein and to the War Production Board that he is familiar with Conservation Order M-119 (in its present form or as it may be amended from time to time) and that, during the life of such Order, he will not use any Rubber Sealed Closures purchased from the seller pursuant to this or future contracts or orders, in violation of the terms of such Order.

Dated .....

.....

By .....

Conservation Order No. M-124[1]

THE fulfillment of requirements for the defense of the United States has created a shortage in the supply of rubber for defense, for private account, and for export; and the following Order is deemed necessary and appropriate in the public interest and to promote the national defense:

Section 1173 *Conservation Order No. M-124* (a) *Definitions.* For the purpose of this Order:

(1) "Person" means any individual, partnership, association, business trust, corporation, governmental corporation or agency, or any organized group of persons whether incorporated or not.

(b) *Restrictions on Sales and Deliveries.* Except as specifically authorized by the Director of Industry Operations, no Person shall, during the period beginning at 12:01 o'clock a.m. on March 29, 1942, and ending at 12:01 o'clock a.m. on April 30, 1942, sell or make delivery or purchase, order or accept delivery of any rubber yarn or elastic thread, except for the purposes of filling defense orders.

(c) *Restrictions on Knitting, Weaving, and Other Uses.* Except as specifically authorized by the Director of Industry Operations, no Person shall, during the period beginning at 12:01 o'clock a.m. on March 29, 1942, and ending at 12:01 o'clock a.m. on April 30, 1942, knit, weave, or otherwise process or use any rubber yarn or elastic thread, except for the purposes of filling defense orders.

(d) *Appeal* Any Person affected by this Order, who considers that compliance herewith would work an exceptional or unreasonable hardship upon him, may appeal to the War Production Board, Washington, D. C., by letter or telegram; Ref. M-124, setting forth the pertinent facts and the reasons he considers he is entitled to relief. The Director of Industry Operations may thereupon take such action as he deems appropriate.

(e) *Violations.* Any Person who violates any provision of this Order and who by any act of conduct falsifies records to be kept or information to be furnished pursuant to this Order, may be prohibited from receiving further deliveries of any material subject to allocation, and such further action may be taken as is deemed appropriate including a recommendation for prosecution under Section 35(a) of the Criminal Code (18 U.S.C. 80).

(f) *Effective Date.* This Order shall take effect immediately.

Issued this 28th day of March, 1942.

J. S. KNOWLSON
Director of Industry Operations

Amendment No. 1

Section 1173.1 (Conservation Order No. M-124) is hereby amended as follows:

By substituting a semi-colon for the period at the end of paragraph (c) and adding to such paragraph the following: "provided, however, that such restrictions shall not apply to rubber yarn and elastic thread which, prior to 12:01 o'clock a.m., March 29, 1942, had been placed on a knitting machine, braider, or loom, or which had been removed from the vendor's container wrapping, packing, or 'put-up' and placed on quills, cones, cops, spools, bobbins, tubes, beams or warps prior to 12:01 o'clock a.m., March 29, 1942."

This Amendment shall take effect immediately.

Issued this 1st day of April, 1942.

J. S. KNOWLSON
Director of Industry Operations

[1] Title 32—National Defense, Chapter IX—War Production Board, Subchapter B—Division of Industry Operations, Part 1173—Rubber Yarn and Elastic Thread.

Rapid Progress of Guayule Project

RAPID progress in the guayule rubber production project is reported by the Department of Agriculture's Forest Service. Seed sowing for 500 acres of nursery beds near Salinas, Calif., started late in March; plowing and disking of the beds, and soil surveys and maps have been completed. Sowing will follow progressively behind installation of irrigation systems in the nursery.

Since March 5, when the guayule rubber production act was signed, a seed treating building, 80 by 109 feet, was completed and put in operation. Some 13,000 pounds of screened sawdust, in which seed is mixed before sowing, has been delivered.

Over three million feet of lumber is being delivered for 911 miles of one- by eight-inch cleated track or duckboards on which equipment is operated over the 48-inch wide seed beds.

About 25 miles of windbreak fencing has been transferred from the Prairie States Forestry Project. One hundred miles will be needed for the entire nursery. The Forest Service's Central States Region has also supplied windbreaks.

Digging and field planting the 10,500,000 seedlings acquired from the Intercontinental Rubber Co. started March 5. Planting will proceed at an increased pace as weather permits, utilizing six planting machines obtained and repaired. About 875 acres of field planting were completed the beginning of April.

Camp facilities are being constructed to house labor, and one 200-man unit is ready. Much CCC camp equipment will be transferred to the project. Some needed equipment has been transferred also from Departmental bureaus; some has been rented, and some purchased, either new or second-hand. Altogether more than 125 trucks, 85 tractors, and 420 pieces of farm machinery have been started toward Salinas or are actually in service. Equipment repair and machine shop buildings, besides a warehouse for small equipment and tools, have been established and are in operation.

About 500 workers are on the job in California, including Forest Service personnel detailed from several regions and local laborers. A contract has been let to furnish food, bedding, and other housekeeping facilities for laborers who will occupy the Forest Service camp. Investigations by the Bureau of Plant Industry on the establishment of test plots for guayule production are under way in other areas, including Mexico, and the Bureau of Agriculture Chemistry and Engineering is also checking on guayule rubber manufacturing facilities.

EDITORIALS

All Out for Exchange of Information

DURING the next few years the rubber industry must undergo one of the most drastic fundamental changes of its entire existence. For over 100 years the basic raw material for the industry has been natural rubber. This must now change. The rubber manufacturer in the years ahead will be faced with a diminishing supply of natural rubber and a sharply increasing supply of the synthetic rubbers. From these relatively new raw materials he must produce serviceable rubber goods. And he must do this if this country is to survive during wartime.

Nearly all the research activities and developments carried out by industry in the past have been aimed at bringing out the optimum properties of natural rubber for its many thousands of uses. Our readers are well aware of the tremendous strides that have been made in rubber technology, which have resulted in products of outstanding durability. These advances, for example, have been the means of increasing tire life from 3,500 miles in 1910 to over 25,000 miles today. What this progress means to the nation now in terms of rubber conservation is obvious. If we didn't have this background of knowledge behind us our whole wartime economy would break down in a few months' time. There just would not be enough rubber to carry on the war.

In the change-over from natural rubber to synthetics the rubber manufacturer can borrow heavily from the wealth of compounding knowledge he has gained from his experience with natural rubber. But, and this point cannot be too strongly emphasized, much work must still be done on the synthetics if the materials are to be utilized as efficiently as natural rubber has been. While the synthetics are related chemically to natural rubber, they are not identical either chemically or physically. They have certain inherent characteristics as, for example, the low degree of tackiness of the butadiene polymers. To overcome the disadvantages of certain characteristics will require considerable research. That is, we must either learn how to modify synthetic rubber compounds through compounding technique, or we must produce synthetic rubbers more nearly comparable to natural rubber. We have no time for the latter; so for the present we must rely on compounding methods to insure the full usefulness of these materials.

Besides the change to synthetics cited above, other important considerations must be faced now. The industry will have available more guayule in the future, and will have to learn how to use this rubber efficiently. Work should be done on using it in conjunction with the synthetics, and it is possible that the proper combination of these two materials may eliminate some of the inherent disadvantages of each. Much work remains to be done on reclaimed rubber, not only as a compounding material for rubber and synthetic rubber mixes, but as a basic raw material in all-reclaim stocks.

The laboratories of the industry are now at work on these problems. Much has already been accomplished although little of this has been published. In the furtherance of any great branch of industrial research, the availability of published articles on the subject is of the greatest value. And until the literature background is built up, the success of the whole effort is retarded.

Today, when we face the sharp reality of large-scale use of new synthetic rubbers and then turn to the published literature to learn how to compound and process them, we find scarcely anything on the subject. Under these conditions each company entering the field must start at the beginning, with much duplication of effort and waste of precious time. Some of our rubber companies have been working on synthetic rubber compounding for years. They probably have knowledge unknown to others that would be of help in furthering our synthetic program, if it were properly disseminated. It is not enough for the company to say that it is willing to give the information to anyone who wants it. The company should take the initiative and see to it that the information becomes generally available now—not after it is too late to be useful. The rubber companies, the producers of synthetic rubber, and suppliers of compounding materials all have their part to play in this vast program.

To further this work, the Division of Rubber Chemistry, A. C. S., should urge its membership to present papers on this subject at future meetings of the Division. Symposiums should be planned now to meet this need. The chairmen of the local rubber groups should also aid by arranging programs designed to circularize such information. Thirty years ago rubber companies jealously guarded their compounding secrets from their competitors. It was difficult to bring about an interchange of information—progress was relatively slow. Rubber chemists would gather at meetings, but they usually went to find out what the other fellow was doing. This attitude has changed to a large extent. But we must do even better now.

We have been told that the government is ready to spend $600,000,000 in building its synthetic rubber industry. If the government took just 1/10% of this amount, $600,000, to establish a central research organization to investigate the production and use of all rubber to be available—*Hevea*, guayule, reclaim, synthetics, etc.—the money expended would be returned many times in terms of advancing our rubber effort. This agency could also further the aims indicated above; it could see that the results of work already done were properly disseminated; it could direct the efforts of individuals in the industry so that wasteful duplication of effort be avoided; and it could coordinate the efforts of all those working on the technical aspects of our rubber problem.

We are at war, an all-out war. What we did before Pearl Harbor no longer holds. We must be ready to give freely and to make sacrifices wherever and whenever our country's interest is at stake.

What the Rubber Chemists Are Doing

Rubber Qualities Chart Drawn Up by A.S.T.M. Committee

AT A special meeting of Sub-Committee IV of Technical Committee A on Rubber Conservation (joint committee of A.S.T.M. Committee D-11 on Rubber Products and the S.A.E. committee on Automotive Rubber), March 19, at the Book-Cadillac Hotel, Detroit, Mich., a Rubber Qualities Chart was approved. The chart, which was considerably revised after the meeting, will be published after it has been finally approved.

Members of the committee agreed that the number of rubber specifications could be very largely reduced to simplify the compounding problem. It was suggested that rubber stock specifications be drawn up which would cover the whole range of properties needed in making rubber articles and that their suitability for special applications also be investigated. Other suggestions included standardization of cooling hose, and of bumper and grommet compounds by Sub-Committee IV. It was recommended that no additional stocks be added for bumper and grommet compounds after the list was drawn up, except by committee agreement. No standardization of compounds is contemplated since it is understood that various companies will have different stocks to meet stock specifications. The action applies only to standardization of physical properties and test methods.

The following recommendations were approved: that Shore Elastometer readings be eliminated from all specifications; that all ash requirements be eliminated from the specification; that color be not made mandatory in general specifications; that only minimum tensiles be used in the classification; that the committee accept the load-deflection figures as verified by Sub-Committee IV; that tensile strength figures be accepted as verified by Sub-Committee IV; and that the classification for rubber stocks be adopted, using letters to indicate stocks for various purposes.

W. J. McCortney, chairman, was authorized to appoint a sub-committee to standardize specifications for synthetic compounds, Sub-Committee V on Synthetic Compounds. The simplification program of this committee is nearly completed and was to have been submitted for approval at the April meeting of Technical Committee A.

Since the object of its program is the conservation of rubber by means of restriction of specifications, Committee A hopes its specifications will be followed as closely as possible by the automotive and aeronautical, as well as allied industries.

REMOVAL NOTICE

On and after May 1, 1942, the office of

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Rubber Division, A. C. S., Activities

Los Angeles Group Hears Synthetic Rubber Discussed

THE Los Angeles Group, Rubber Division, A. C. S., held its seventy-seventh meeting April 7 at the Mayfair Hotel, Los Angeles, Calif., with 130 members and guests present. T. G. Willey, J. A. Fitzgerald, W. R. Hendricks, T. Wigglesworth, R. Harold, and M. Goldman were accepted as new members. T. K. Hill reported for the War Production Board committee, and the Group decided to discontinue this committee because its work overlapped that of a similar C. R. M. A. committee.

The program included a discussion by K. F. Dunkel, of the Olympic Tire Co., Melbourne, Victoria, Australia, on the Australian war effort, and an address by Earl Cranston, of the University of Redlands, on "Problems of the War and Peace." Grieg Strohm, of Pan American Airways System, presented "The Land of the Incas", a color film depicting the development of the resources of several South American countries. A brief résumé of current events was given by John Hoerger. John Brittian, of the Standard Oil Co. of New Jersey, spoke on synthetic rubber and estimated production for the coming year at between 200,000 and 250,000 tons. Mr. Brittian said that a production of from 500,000 to 600,000 tons was expected by 1944. Mr. Cunningham, of the same company, showed samples of buna crepe rubber and discussed the advantages of the buna types of synthetics.

Special prizes were a Remington electric razor donated by E. M. Royal, of H. M. Royal, Inc., and won by J. E. Bolter, of Goodyear Tire & Rubber Co., and a Sheaffer pen and pencil set donated by L. O. Smith, of the National Standard Co., and won by Vergil Lacey, of the J. R. Gardner Co. A set of 7.00x17 miniature tires donated by J. R. Gardner, of the Gardner company, was won by James Wright, of U. S. Rubber Co. Door prizes, donated by the Group, were $10 and $5 worth of War Stamps and were won by C. A. Lamb, of the West American Rubber Co., and I. W. Robertson, of Latex Seamless Products Co. The table favors, trouser hangers, were donated by Binney & Smith Co.

Boston Group Meets

P. M. ELLIOTT, of the Naugatuck Chemical Division of United States Rubber Co., and J. W. Bicknell, managing director of U. S. Rubber's plantation division, were the speakers at a meeting of the Boston Group, Rubber Division, A. C. S., on April 10 at the University Club, Boston, Mass. Approximately 250 members and guests were present at the affair, which was concluded with a showing of the Thaw-Asia motion picture films in sound and color.

Dr. Elliott's talk, which was illustrated by slides showing reclaim manufacture at the Naugatuck plant, covered generally the same ground as a talk which he gave before the New York Group on March 20, reported on page 55 of our April issue.

Mr. Bicknell's talk was centered on the various aspects of our rubber supply problem and was accompanied by a motion picture, "Romance of Rubber", taken on U. S. Rubber's plantations in Sumatra 15 years ago. In commenting on the Japanese invasion of the rubber lands of the Far East, Mr. Bicknell held that it was doubtful that many trees were destroyed in pursuing a "scorched earth" policy, but that it was likely that many factories and much equipment were destroyed, particularly in Malaya from Kuala Lumpur south and in the Dutch East Indies. Mr. Bicknell was also of the opinion that our first real relief in our present rubber shortage would come from synthetic rubber and that we probably would not get more than 60,000 to 65,000 tons of crude rubber from South and Central America. He also discussed the problems of cultivating guayule on a large scale, pointing out that estimates made of the cost of production were largely speculative and based on small-scale experiments. The speaker also mentioned minor sources of rubber which he did not feel would solve our rubber problem.

At the meeting the Group voted to hold its annual outing as usual during June.

Chicago Group Elections

THE Chicago Group, Rubber Division, A. C. S., will elect officers for 1942-43 at a dinner meeting May 1 at the Congress Hotel, Chicago, Ill. The technical portion of the program at 8.15 p.m. will include a presentation by R. L. Sibley, of the Monsanto Chemical Co., on "Rubber Reaction Products."

Detroit Group Meets May 8

THE Detroit Rubber & Plastics Group, Inc., will hold a dinner meeting May 8 at 6:45 p.m. at the Detroit Leland Hotel, Detroit, Mich. The program, scheduled for 8.00 p.m., will include an address by A. A. Sommerville, of the R. T. Vanderbilt Co., New York, N. Y., on "Latest Dope on Synthetic Rubber as Related to Accelerators and Plasticizing and High-Temperature Testing."

N. Y. Group, May 15

THE New York Group, Rubber Division, A. C. S., will hold a technical meeting at 4:30 p.m., May 15, in the clubrooms of the Building Trades Employers' Association, 2 Park Ave., New York, N. Y. This meeting replaces the usual summer outing, which has been canceled. Arthur Carpenter, of Bureau of Industrial Conservation, War Production Board, will address the Group, and J. Miscall, of the Flintkote Co., will offer a paper on "Dispersions." Dinner is scheduled for 6:30 p.m.

Frictional Properties in Rubber[1]

THE results of an extensive laboratory study for the coefficient of friction of rubber are reported in RP1463 by Frank L. Roth, Raymond L. Driscoll, and William L. Holt, which were scheduled for publication in the *Journal of Research* for April. Most previous investigations have dealt with specific rubber products, as tires or belting, and the experimental conditions have been those under which the products are commonly used. In the present investigation it was possible to employ a relatively wide range of experimental conditions and to control the compositions and surface conditions of the specimens and the tracks. The principal factors considered were speed of slide, roughness of sliding surfaces, pressure of one surface on the other, size of specimens, cleanliness of sliding surfaces, and composition of the rubber.

The following results were obtained:

1. When a clean rubber specimen is towed at a constant speed of 10^{-5} cm./sec. or more along a smooth track, the friction increases, reaching a constant equilibrium value only after several centimeters, of slide; correspondingly, when the specimen is allowed to slide down an inclined track under a constant load, the speed decreases to its equilibrium value. When a specimen is towed at a speed appreciably less than 10^{-3} cm./sec., the friction decreases to its equilibrium value; correspondingly, a specimen will continue to slide down an incline even after the angle of incline is decreased to a value less than the angle of repose.

2. The equilibrium coefficient of friction increases markedly with speed—the values varying from about 1 at speeds of the order of 10^{-4} cm./sec. to more than 4 at speeds of about 5 cm./sec. The occurrence of vibrations of the specimens prevented observations at speeds much over 5 cm./sec. The softer rubber compounds vibrated at even lower speeds.

3. The equilibrium coefficients of friction for very low sliding speeds are less than the coefficient of static friction, but at speeds of 10^{-3} cm./sec. or greater the dynamic coefficients are greater.

4. Except for speeds appreciably below 10^{-3} cm./sec., the rougher the sliding surfaces the lower are the observed coefficients.

5. The coefficients of friction for a rubber compound are not greatly dependent on the compounding ingredients so long as these ingredients do not bloom out on the sliding surface. The presence of materials such as bloom or talc on the surfaces decreases the values of the observed coefficients.

[1] *Tech. News Bulletin*, Apr., 1942, p. 26.

Inflammability of Acrylonitrile

THE methods and results of tests on the explosive hazards of acrylonitrile, a combustible liquid used in making Buna-N, are reported in a Bureau of Mines publication, "Limits of Inflammability of Acrylonitrile in Air" (R. I. 3597, Bureau of Mines) by G. W. Jones, R. E. Kennedy, and G. S. Scott. The essential apparatus consisted of a mercury sealed mixing device attached to an explosion tube 150 centimeters in length and five centimeters in diameter, and a vaporizer attached to the tube. The percentage of acrylonitrile to be added was determined by the partial pressure method. In a darkened room the mercury seal was removed, and an alcohol flame passed across the open end of the tube as a ground-glass plate was removed from it. If flame propagated through the entire mixture, the next mixture was prepared with a slightly lower concentration of acrylonitrile. The average of mixtures that just propagated the flame through the tube and those that just failed to do so were recorded.

It was found that acrylonitrile and air produced inflammable mixtures at temperatures between –6.25° C. and 29.4° C. at a barometric pressure of 745 to 750 mm. Hg. At temperatures above the higher figure flame did not propagate because of the large amount of combustible vapor in the mixture. At temperatures below –6.25° C. there was not sufficient vapor pressure to give an inflammable mixture. The lower limit of inflammability of acrylonitrile in air at laboratory temperatures (20 to 27° C.) and pressures was determined to be 3.05% by volume. Because the vapor pressure of acrylonitrile was insufficient to produce upper-limit mixtures at laboratory temperatures, the highest temperature at which air saturated with acrylonitrile vapor gave mixtures that propagated flame was determined. The upper limit of inflammability, calculated from data on the vapor pressure at that temperature (29.4° C.) and the barometric pressure (747.5 mm. Hg.) at the time the tests were made, was found to be 17.0 ± 0.5% by volume.

Representative August H. Andresen, of Minnesota, said March 30 that he had been advised that arrangements were being made to expedite transportation of *kok-sagyz* seeds from Russia. He had previously asked that the seed be brought by planes to permit April planting which would make possible harvest of the roots this autumn for rubber as well as seeds for 1943 sowing. The plan involves experimental planting in 42 states.

Plasticizers for Reclaim and Synthetics

BUNNATOL G and Bunnatol S are plasticizers for synthetic and reclaimed rubber, recently developed by The Beacon Co., 89 Bickford St., Boston, Mass. Both are reportedly insoluble in mineral and vegetable oils and therefore impart to the finished product increased resistance to oils and greases. Additions are made slowly in small amounts, allowing each portion to be completely absorbed by the stock on the mill before more is added, and 4½% to 10% is said to give a flexibility equal to approximately 25% dibutyl phthalate. The Bunnatols also act as wetting agents for pigments. Their use is said to permit a minimum of milling and grinding for maximum dispersion throughout the stock.

China Clay Output Up

SALES of domestic China clay in 1941 totaled 1,087,848 short tons, value $9,205,892, compared with 833,450 tons, value $6,994,106, in 1940, according to the annual report of the Bureau of Mines, United States Department of the Interior. Georgia was the leading kaolin producer with 72% (787,013 short tons) of the total national output. The consumption of clay last year by the rubber industry and other industries increased sharply. Price quotations have remained almost unchanged for the past few years, and the gradual increases in average value of domestic sales from $7.94 in 1939 to $8.46 in 1941 reflect the use of a larger proportion of higher grade clays rather than a general increase in prices.

Calcium Carbonate in Rubber

NATIONAL BUREAU OF STANDARDS is conducting a study of the effect of fillers on the electrical properties of rubber to determine general relations between the properties and proportion of filler and the dielectric constant, power factor, and conductivity of the compounded rubber. The results obtained with calcium carbonate are reported by Arnold H. Scott and Archibald T. McPherson in the *Journal of Research* for March (RP1457). The system rubber-calcium carbonate presents a relatively simple case for study for electrical properties of calcium carbonate do not differ so greatly from those of rubber as do the properties of many other fillers.

The experimental compounds used were prepared by incorporating reagent-quality calcium carbonate into two simple base compounds: one consisted only of Vistanex, a synthetic rubber-like hydrocarbon, employed without vulcanization; the other, made from natural rubber, was vulcanized by means of tetramethylthiuram disulphide. The calcium carbonate was used in proportions up to about 50% by volume.

It was found possible to express the relation between the dielectric constant and the volume fraction of calcium carbonate by the general relation,

$$\frac{K-K_1}{K+FK_1}=V_2\frac{K_2-K_1}{K_2+FK_1},$$

where F is a constant having the value 2.7; K, K_1, and K_2 are the dielectric constants of the mixture, the base compound, and the calcium carbonate, respectively; and V_2 is the volume fraction of the calcium carbonate. At a frequency of 1,000 cycles per second and a temperature of about 25° C. the natural rubber base compound has a dielectric constant 2.52, the Vistanex, 2.29, and calcium carbonate, 8.75. The power factor and the conductivity increase with increasing percentages of calcium carbonate, but do not seem to bear any simple relation to the composition.

Quebec Hears Ball on Synthetic Compounds

THE Quebec Rubber & Plastics Group meeting, April 10, at McGill University, Montreal, P. Q., Canada, was attended by more than 60 members. J. M. Ball, of the R. T. Vanderbilt Co., New York, N. Y., spoke on "Synthetic Rubber Compounds." His discussion of the milling, plasticizing, and compounding characteristics of seven different synthetic rubbers was illustrated with samples and tests to show the wide variance of different elastomers. Samples and photographs of the seven synthetics both in the raw state and after mastication on a cold laboratory mill, and cured and uncured samples of one synthetic after plasticizing and compounding were exhibited. Slides of several compounds also charted the tensile properties, hardness, and resistance to hot oil of each. To test resiliency solid balls were dropped at both room temperature and the temperature of boiling water from a height of two feet on to an iron plate. The percentage of rebound was noted, and it was found that resiliency varied widely with the compounds and with temperature.

A. E. Byrn, of the Canadian General Electric Co., will discuss Glyptal resins and other plastics at the Group meeting on May 8. This, the last meeting of the season, replaces the canceled plastics meeting on March 6.

Ontario Elects Officers

AT THE March 19 meeting at the University of Toronto, Toronto, Ont., the Ontario Rubber Section, Canadian Chemical Association, elected the following officers for 1942: chairman, J. C. Howard, of Kaufman Rubber Co., Kitchener, Ont.; secretary-treasurer, J. Ramsay, Gutta Percha & Rubber Co., Toronto; program committee, N. S. Grace, Dunlop Tire & Rubber Co., Toronto, R. M. Ferguson, Naugatuck Chemical Division, Elmira, Ont., and G. H. Arnold, Boston Insulated Wire & Cable Co., Hamilton, Ont.

New Accelerators and Waxes

FOUR organic accelerators were announced recently by the Rubber Service Department, Monsanto Chemical Co., Akron, O. "Butasan", a zinc salt of dibutyl dithiocarbamic acid, has a specific gravity of 1.24 and a melting point of 106° C. It cures at temperatures below 100° C. and is added in amounts of from 0.5% to 1% on the rubber weight for latex, cements, dipped goods, adhesives, coatings, and other products. "Ethasan", a zinc salt of diethyl dithiocarbamic acid, has a specific gravity of 1.5, a melting point of 173° C., and is used in amounts of 0.5% to 1% on the rubber weight in latex. "Methasan", a zinc salt of dimethyl dithiocarbamic acid, has a specific gravity of 2.00 and a melting point of 249° C. It cures at temperatures below 100° C. and combines in amounts of 0.5% to 1% on rubber weight in latex and cement compounds. "A-46" is a constant composition blend of El Sixty and Santocure, previously developed Monsanto accelerators.

Santowax M, O, and P are three hydrocarbon waxes recently developed by Monsanto's Phosphate Division to supplement Santowax regular. Preliminary investigations have indicated their usefulness as lubricants for high-temperature service and as plasticizers in coatings and finishes. Santowax M (melting point 181° F. to 194° F.), a micro-crystalline wax, and Santowax P (melting point about 410° F.), a nearly white crystalline material, have unusual stability to heat. Santowax O is an oily crystalline material with a melting point of less than 122° F.

Alarm Device Utilizes Wire Fence

AN ACCOUSTIC apparatus that may be applied to any establishment enclosed within a wire fence has the effect of multiplying by many times the number of guards on duty and enabling the human guardsmen, regardless of heavy fog, blackouts, or night storms, to become informed immediately of any disturbance for blocks or even several miles along the fence line. The robot sentry system is said to pick up a whisper, the snip of a wire cutter, or the sound of a pick and to relay the sound to the human watchman at his post or to a central guard station inside the plant. The system may be adjusted to screen out extraneous sounds and pick up only those likely to be important. The warning alarms can be heard through a loud speaker or made to record themselves silently on a moving tape or drum, showing the exact hour, minute, and second received. The signals may also be arranged to ring a bell or may be automatically relayed to a police or military headquarters.

In addition to extending the hearing range of guards, the system provides over a line that is always open a means of communication between a guard and a central station to which he may report or call for help by tapping in an established code.

The device, invented by a du Pont engineer, is reportedly successful for installation along the high wire fences that enclose small factories, sub-stations, power houses, warehouses, and army depots as well as large plants. Automatic Alarms, Inc.

Asks for Civilian Tires

THE Petroleum Industry War Council April 8 submitted to Petroleum Coordinator Harold L. Ickes a resolution asking that appropriate federal agencies take immediate steps to provide money and allocate construction materials for an annual production of 300,000 tons minimum of synthetic rubber for civilian use beyond the 700,000 tons program for war and essential needs. The Council appointed a committee of 12 men, representing the entire petroleum industry, to study the problems of synthetic production, especially that of Butyl rubber, to determine its practicability in meeting the tire shortage and to develop and prosecute a program to obtain synthetic rubber for essential civilian uses.

United States Civil Service Commission is continuing its drive for technologists to fill the government's needs. Those interested should apply to the Commission's Recruiting Section, 613 G. Street, N.W., Third Floor, Washington.

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Abrasive Mask with Gum Rubber Hood

NO. 602 Healthguard Abrasive Mask consists of a soft molded rubber face-piece, with large replaceable laminated glass lenses, held in place by head straps. In use, the unit is completely covered by a pure gum rubber hood (not illustrated) which protects the head, neck, and shoulders. The hood lens holder is fitted with laminated glass protected by a metal screen.

Healthguard Abrasive Mask without Protective Rubber Hood

Air under regulated pressure passes from a hose connected to the supply and through a filter unit, which has a replaceable cartridge, to remove foreign particles and odors. A control valve regulates the flow of pure air to the face-piece where an automatic relief valve eliminates excessive pressure. Incoming air entering the face-piece strikes a baffled wall to effect an even distribution and circulation of the supply. A one-way exhaust valve releases exhaled air which circulates through the outer hood.

The mask is said to be useful in industries in which harmful dusts are encountered as in sandblasting. Low operating pressures of two to nine pounds per square inch are claimed to result in full efficiency at low cost. Chicago Eye Shield Co.

Plastic Sole for Dress Shoes

A NEW sole for dress shoes, Neolite, makes use of the firm's synthetic resin, Pliolite, a derivative of rubber. Waterproof, slip-resistant, and lightweight as leather, the new plastic sole is claimed to have a wearing quality twice that of leather and an ability of retaining its original shape unequalled by the usual soling materials. A firmness that affords a high degree of foot protection and comfortable walking is also claimed for the product. Neolite is said to have had favorable reception by men's dress shoe manufacturers and retailers. Goodyear Tire & Rubber Co.

Pliofilm Casing for Meat Packaging

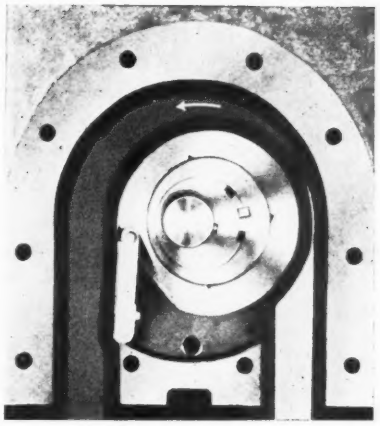
NON-POROUS Naturalux Pliofilm Casing may be used for processing as well as preserving any type of sausage which does not require smoking in the casing. Longitudinal reenforcement is said to prevent the sausage from stretching lengthwise and a special treatment which imparts a circumferential contractive force to the material enable the sides of the container to press the outer surface of the meat throughout processing without surface distortion. The casing slices without falling away from the meat or cupping of cut slices. The non-porous quality of the casing is reported to prevent loss in weight during or after cooking; escape of flavor, juices, and vitamins; the absorption of odors; and the formation of a hard crust or colloidal film on the outer surface. It is claimed the casing does not itself spoil or develop offensive flavors, and that it retards formation molds, fungus growth and slime. The casing, which is of Goodyear Pliofilm, is made by Naturalux Products Corp.

Seamless Latex Surgical Tubing

SEAMLESS and odorless R-L-P latex table having smooth inner and outer walls is produced from compounded liquid latex without the use of acid or salt coagulants which is said to eliminate the presence of deleterious chemicals or their decomposition products in the finished goods. The inner surface is formed directly from the latex upon a film of potash soap of cocoanut oil which provides a means of protecting the inner surface from dust or air. This soap seal remains intact until the final washing and sterilization before use. The tubing is made in sizes of accurate gage, and it is claimed to be resistant to aging and to the effects of sterilization. Rubber-Latex Products, Inc.

"Squeegee" Action Pump

THE Downington-Huber "Squeegee" type of pump consists of a flexible pure gum rubber tube externally compressed and released by a steel or cast-iron compression ring. Inside the ring a rotating drive shaft is connected to an "off center" rotor which is keyed to an adjustable eccentric. The shaft and both rotors, turning as a unit, push the compressor ring radially against the tube. This continuous progressive action along the curved portion of the tube effects a rocking action from the suction to the discharge side. Compression of the tube moves the contents forward. The return of the tube to normal diameter produces a vacuum to inhale more liquid or gas which is expelled in the next cycle. The tube can also be made of various acid- and oil-resisting synthetics, or rubber tubes can be lined with corrosion resistant material. The pump is available in several sizes and types. Huber Pump Division, Downington Mfg. Co.



"Squeegee" Pump—Quarter Cycle

Major Charles Kerwood of the United States Army Air Force Inspects an Inflatable Rubber Life Vest for Army Fliers, Made by Goodyear Tire & Rubber Co.

UNITED STATES

Congressional Investigation of Rubber Continued; Further Restrictions on Rubber Also Announced

Standard Oil denied charges of retarding development of the synthetic rubber program in this country (see below); while Jesse Jones gave his version of the synthetic rubber situation. (See page 160.)

A new bill was introduced in the Senate (see page 159) calling for government construction of synthetic rubber production plants with an annual capacity of 400,000 tons, to be operated by a specially created government agency.

Twenty-five companies have been awarded contracts in the 700,000-ton program for synthetic rubber. (See page 160.)

A committee has been formed to stimulate rubber production in Latin America and Africa. (See page 165.)

Two conservation orders also were issued in an effort to alleviate the rubber shortage. M-119 bans the use of rubber on containers for more than 40 groups of products. (See page 149.) Order M-124 freezes all stocks of rubber yarns and elastic thread (see pages 150, 161) prior to an allocating order.

Amendment 7 to No. M-15-b revises, and downward in many instances, specifications for rubber goods (see pages 147, 161); while No. 8 prohibits the manufacture of blowout shoes (see page 148) and restricts the manufacture of reliners.

Amendment No. 3 to No. M-15-b-1 makes provision for retreading materials for a limited number of tires for war workers, changes specifications for tires and camelback, prohibits the use of rubber in a number of items for the Army, and gives specifications for hospital sheeting. See pages 146, 162.) Amendment No. 4 (see pages 146, 162) indicates specifications governing the use of rubber as insulation on neutral electrical wires are effective on May 1.

The Board of Economic Warfare by recent presidential action has been charged with the responsibility of importing rubber and other critical materials. (See page 166.)

Methods of development specifications for mechanical rubber goods products have been discussed with the industry committee at a recent meeting, it was announced April 6 by the Rubber and Rubber Products Branch. The products affected are used primarily by industry.

Farish Testifies on Standard Synthetic Rubber Development[1]

W. S. Farish, president of the Standard Oil Co. of N. J., testifying March 31 and subsequent days before the Senate Committee Investigating the National Defense Program (Truman Committee), denied, among other charges, that Standard had refused to disclose its development of Butyl rubber to the government or had retarded development of synthetic rubber in the United States. He declared that the Standard arrangement with I. G. Farbenindustrie covered by the Hague Memorandum of September, 1939, for the purpose of adjusting relations to the situations resulting from the war in Europe, were "reasonable and expedient, and in the interests of the United States." This arrangement "sought to obtain assignment of the legal title to every patent anywhere in the world in which we had an important interest, in order to protect that interest," and to "get rid of the German interest in the American corporations, eliminate their control of the processes of making rubber and other synthetics in which we had only a minority interest, and remove all necessity for any further consultations by us with the Germans in the handling of the patent licensing."

These objectives were accomplished, Mr. Farish said, by obtaining the patent assignments, by purchasing the German 20% interest in the Standard I.-G. Co., and by taking over the entire ownership of Jasco (Joint American Study Co.). Jasco, which owned the oil-chemical patents and in which the German firm had previously held a 50% interest, in turn surrendered all its claims on the processes for all countries of the world except the French and British empires and the United States, which Jasco retained. He maintained that through this arrangement the entire contract relations between Standard and I. G. became a simple question of money payments and of administering I. G.'s minority interest in the oil patent rights without any personal relations or opportunity for exchange of views.

Mr. Farish further contended that Standard's technical information about Buna S, Buna N, and Butyl rubber, as well as samples, were given freely to the United States Army and Navy, and submitted 26 exhibits, consisting of letters, memorandums, and samples of synthetic rubber products prepared under cooperative arrangements with government agencies, tending to show Standard's wish to cooperate with the government in synthetic development. These exhibits dated from January, 1939, eight months before the European war began, and about three years before the Japanese attack on Pearl Harbor and included alleged proofs of cooperative programs on Butyl rubber with the Chemical Warfare Service and work with the Navy Bureau of Construction and Repair in 1939. The reason advanced by Mr. Farish for the late commercial development of Butyl was that Standard engineers were not prepared to say until March 14, 1941, that they could design a commercial unit for satisfactory operation. Laboratory pilot units of one-half ton per week maximum capacity had been the only source of information on Butyl. An appropriation of $2,500,000 was made on June 11, 1941, and increased by $2,000,000 on October 27, 1941, so that when the United States entered the war, construction was under way for a 7,300-ton annual production of Butyl. This plant, the testimony indicated, will be further expanded for an annual production of 40,000 tons.

Turning to buna, Mr. Farish stated that leading rubber companies advised Standard in 1939 that any commercial production of Buna S would be impossible without government subsidy and support. But Standard offered licenses to three large rubber companies for Buna N for specialty uses and on April 14 had completed construction of its own Buna N plant at a cost of $1,000,000. The five-ton daily capacity was subsequently doubled. This plant was also used to produce more than 100 tons of Buna S to make experimental tires for the United States Army.

In connection with the government's rubber program, Mr. Farish said that it was found in 1939 that no agency had

[1] For earlier details see our Apr. 1, 1942, issue, pp. 58, 61.

CALENDAR

May 1.	Chicago Rubber Group. Congress Hotel.
May 7-8.	Association of American Battery Manufacturers, Inc. Spring Meeting. Netherland Plaza Hotel, Cincinnati, O.
May 8.	Quebec Rubber & Plastics Group.
May 8.	Detroit Rubber & Plastics Group, Inc. Detroit Leland Hotel.
May 11-13.	American Institute of Chemical Engineers. Thirty-fourth Semi-Annual Meeting. Statler Hotel, Boston, Mass.
May 15.	New York Rubber Group. Building Employers' Trade Assn. Clubrooms, 2 Park Ave.
May 25-28.	National Association of Purchasing Agents. 27th Annual Convention and Inform-a-Show. Hotel Waldorf-Astoria, New York, N. Y.
June 1-2.	Canadian Chemical Association. Convention, Hamilton, Ont.
June 8-11.	A.S.M.E. Semi-Annual Meeting. Cleveland, O.
June 18-20.	Colloid Symposium. National Research Council and Division of Colloid Chemistry, A. C. S. Boulder, Colo.
June 22-26.	A.S.T.M. Chalfonte-Haddon Hall, Atlantic City, N. J.

the necessary authority or funds to sponsor production, but from that time Standard had urged an adequate government synthetic program. In addition to supplying the Army and the Navy Standard also furnished Butyl rubber to the National Bureau of Standards and two university professors working on defense projects. Other Standard cooperative measures included discussions and exchange of views in 1940 with E. R. Stettinius, Jr., of the Advisory Commission to the Council of National Defense and with the Reconstruction Finance Corp. Supporting evidence to show Standard's various proposals and plans for development of a synthetic rubber program and construction of plants with government cooperation was introduced. In 1941, Standard wrote OPM urging construction of four plants, each having an annual capacity of 10,000 tons to be erected by four major tire manufacturing companies, as an absolute minimum program, and erection of necessary butadiene and styrene plants.

In September, 1941, the Rubber Reserve Co. instructed Standard to suspend for one year all work on the Federal Defense Plant Corp. 15,000-ton butadiene project which had been authorized July 22, 1941, by the RFC. Standard, however, continued the work at its own expense.

Concerning the allegation that I.G. withheld technical information from Standard on German synthetic rubber, Mr. Farish said that the efforts of the Standard technical staff showed that sufficient information for the erection of plants and production of buna rubber was on hand in the United States by 1939.

"Using the disclosures made in the patents themselves and such further information as was available by October of that year, we had the process ready for plant design by 1940, at which time we proceeded to construct such a plant."

Because isobutylene, the main raw material for making Butyl, comes from oil refining processes and is not available in Germany in large quantities, the information Standard gave I.G. on Butyl at its early stage of development in 1938 could have no political or military implications, Mr. Farish stated. He added that all exchange of information on Butyl stopped in January, 1940.

Testimony on Synthetics Cost

R. P. Russell, an official of the Standard Oil Development Co., testifying before the Truman Committee on April 8, pointed out that the controlled price of natural rubber was always an imminent threat to large-volume production of synthetic rubber since a manufacturer starting production when natural crude was selling at 22¢ per pound had to face the possibility of an overnight drop of the controlled price of plantation rubber to a 10¢ or even 5¢ per pound level. None of the known synthetic rubbers can be produced at a cost competitive with the true cost of natural rubber, he said. The cost of producing synthetic rubber ranges from approximately 15¢ per pound to 40¢ per pound on a large scale. Because of the low true production cost of natural rubber, its availability in normal times, and its rigidly controlled price, it was obvious, Mr. Russell stated, that a synthetic production large enough to replace all or even a substantial part of crude consumption could only be attained with the aid of a government subsidy as was the case in Germany.

An investment of from $700 to $1,000 is required to produce one ton of synthetic rubber a year. The 700,000-ton per year program involves the investment in steel, other construction materials, and labor of about $700,000,000 or possibly more.

Rapid construction of synthetic plants depends upon the availability of steel beyond what is needed for ships, tanks, guns, explosives, aviation gasoline plants, and other pressing wartime requirements. If critical materials are allocated and if skilled labor is available, synthetic plants can be built in from 18 months to two years, Mr. Russell affirmed, but stated that the realization of the plans for the 700,000-ton program depends very largely on factors outside industry's control.

Butyl Production

The Standard Oil Co. of N. J. announced that the initial production of Butyl rubber will be available in November and will come from a $4,500,000 Standard financed plant in the South on which construction began in August, 1940. Jesse Jones stated on April 7 that the 700,000-ton synthetic program includes 60,000 tons annually of Butyl to be produced by Standard.

New Synthetic Rubber Bill

Senator James E. Murray, of Montana, recently introduced in the Senate of the United States the following bill (S. 2444), which was read twice and referred to the Committee on Military Affairs:

A BILL

To authorize the Federal Works Administrator to construct synthetic-rubber-production plants having an annual productive capacity of four hundred thousand tons and to create the United States Rubber Authority to operate such plants.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Federal Works Administrator (hereinafter referred to as the "Administrator") is authorized and directed to provide, on behalf of the United States, for the construction and equipping of synthetic-rubber-production plants having an annual productive capacity of four hundred thousand tons, which shall be in addition to any other such plants constructed or provided for by any other governmental agency.

SEC. 2. To the extent necessary to carry out the provisions of the first section of this Act, the Administrator is authorized—

(1) to acquire by purchase, donation, exchange, lease, or condemnation lands and interests in lands;

(2) to provide, by contract or otherwise, for the making of surveys, investigations, plans, and designs, and for the construction of structures, buildings, and facilities; and

(3) to acquire, by contract or otherwise, machinery and equipment, and to provide, by contract or otherwise, for the installation of such machinery and equipment.

SEC. 3. Section 3709 of the Revised Statutes shall not be applicable with respect to any purchase or contract made by the Administrator pursuant to the provisions of section 2 of this Act.

SEC. 4. In selecting the sites upon which to construct such synthetic-rubber-production plants the Administrator shall give due consideration to the advisability of so locating such plants as (1) to have them in close proximity to the sources of raw materials for the production of synthetic rubber, (2) to make them as invulnerable to enemy attacks as possible, and (3) to provide for the decentralization of the synthetic-rubber-production industry.

SEC. 5. Whenever the Administrator determines that the construction and equipping of any such plant is sufficiently advanced to enable such plant to be used for the production of synthetic rubber, he shall so notify the United States Rubber Authority, created by section 6 of this Act, and the Authority shall commence the production of synthetic rubber in such plant. Upon completion of the construction and equipping of any such plant the Administrator shall transfer title thereto and possession thereof to the Authority and the Authority shall thereafter operate and maintain such plant.

SEC. 6. (a) There is hereby created a body corporate under the name "United States Rubber Authority" (hereinafter referred to as the "Authority"). The principal office of the Authority shall be located in the District of Columbia, but the Authority may establish such branch offices in other places in the United States as may be determined by the board of directors.

(b) The Authority shall have capital stock of $100,000,000, subscribed for by the United States through the Secretary of the Treasury, and payment for which shall be subject to call in whole or in part by the board of directors of the Authority. Receipts for payments by the United States for or on account of such capital stock shall be issued by the Authority to the Secretary of the Treasury and shall be evidence of the stock ownership by the United States.

(c) The management of the Authority shall be vested in a board of three directors to be appointed by the President, by and with the advice and consent of the Senate. Each director shall receive a salary at the rate of $10,000 a year and shall hold office for a term of six years, except that (1) any director appointed to fill a vacancy occurring prior to the expiration of the term for which his predecessor was appointed, shall be appointed for the remainder of such term; and (2) the terms of office of the directors first taking office after the date of the enactment of this Act shall expire, as designated by the President at the time of appointment, one at the end of two years, one at the end of four years, and one at the end of six years, after the date of the enactment of this Act. The President shall designate one of the directors as the chairman of the board.

(d) The Authority shall have power to adopt, alter, and use a corporate seal,

which shall be judicially noticed; to make contracts; to lease such real estate as may be necessary for the transaction of its business; to sue and be sued, to complain and to defend, in any court of competent jurisdiction, State or Federal; to select, employ, and fix the compensation of such officers, employes, attorneys, and agents as shall be necessary for the transaction of the business of the Authority; to define their authority and duties, require bonds of them, and fix the penalties thereof; and to prescribe, amend, and repeal, by its board of directors, bylaws, rules, and regulations governing the manner in which its general business may be conducted and the powers granted to it by law may be exercised and enjoyed. The board of directors of the Authority shall determine and prescribe the manner in which its obligations shall be incurred and its expenses allowed and paid. The Authority shall be entitled to the free use of the United States mails in the same manner as the executive departments of the Government. The Authority, with the consent of any board, commission, independent establishment, or executive department of the Government, including any field service thereof, may avail itself of the use of information, services, facilities, officers, and employes thereof in carrying out the provisions of this Act.

(e) All moneys of the Authority not otherwise employed may be deposited with the Treasurer of the United States subject to check by authority of the Corporation or in any Federal Reserve bank. The Federal Reserve banks are authorized and directed to act as depositaries, custodians, and fiscal agents for the Authority in the general performance of its powers conferred by this Act.

(f) The Authority is empowered to operate and maintain any plants transferred to it by the Administrator, to engage in the production of synthetic rubber, to sell any synthetic rubber produced by it, to conduct research with respect to methods of producing synthetic rubber or substitutes for rubber and with respect to uses for synthetic rubber or substitutes for rubber, and to do all things necessary to enable it to exercise the foregoing powers.

(g) The Authority shall make a full report to Congress, at the beginning of each regular session, with respect to its operations during the preceding year.

SEC. 7. The appropriation of such sums as may be necessary to carry out the provisions of this Act is hereby authorized.

Jones Outlines Rubber Program

Testifying before the Truman Committee on April 7, Jesse Jones, Secretary of Commerce, denied responsibility for delaying the synthetic rubber program.

"Until I read Mr. Batt's testimony before your committee," he said, "I thought we were following his and Mr. Stettinius' recommendations in the experimental rubber program. The program adopted by the Rubber Reserve Co. will produce about 70,000 tons and not 10,000 or 40,000. Our original program, together with privately owned facilities, will bring the total capacity to approximately 100,000 tons and fulfills the recommendations of Mr. Stettinius and Mr. Batt."

Mr. Jones was questioned as to what efforts had been made to obtain high priorities on equipment for making synthetic rubber, and it was brought out that steel and machinery for such purposes remained far down on the priorities list until March 3, 1942, when it was given an A-1 rating. His answers to questions placed by Hugh Felton, general counsel of the committee, showed that the stockpile of the Rubber Reserve Co. increased from 40,143 long tons on December 31, 1940, to 342,101 tons on March 20, 1942. But the accumulation was dependent, in part, upon export quotas set by the International Rubber Regulation Committee, which were, however, consistently raised at the insistence of the Rubber Reserve Co. and the Federal Loan Administrator. British and Dutch interests apparently did not want the quotas increased to an extent that would seriously affect the post-war market. Mr. Jones stated that heavy buying by Great Britain and Russia and a shortage of shipping space was responsible for failure to obtain the goal of a 150,000-ton stockpile by the end of 1940. He explained that a large portion of Far Eastern rubber was not transported in American boats and that the United States had no control over the routing of foreign vessels. After December 7, 1941, about 187,486 tons were shipped to this country, and since that date the United States stockpile has increased 87,045 tons. No provisions were made for a latex stockpile because of lack of storage and transportation facilities, construction of which would have necessitated use of materials needed in other phases of the defense program.

With regard to synthetic rubber Mr. Jones stated that neither the War nor Navy departments have made any recommendations to the Rubber Reserve Co. or the Federal Loan Administrator, and that representatives of the various interested companies have never presented joint or uniform proposals. The contracts between the Rubber Reserve Co. and synthetic manufacturers, and most of the contracts with suppliers of raw materials, provide for compensation on a cost plus fixed fee basis. The net price of Buna S is estimated at between 25¢ and 35¢ per pound by the participating companies, Mr. Jones said, but added his opinion that those estimates were too low. In reply to a question by counsel concerning the making of Butyl by companies other than Standard Oil of N. J., he replied that the matter should be investigated, but that to date contracts for Butyl had been given only to Standard.

The Secretary of Commerce expressed his opinion that production costs of either synthetic or plantation guayule cannot compete with those of tree rubber. Both, he stated, should be regarded strictly as war industries undertaken without regard to cost.

He also expressed doubt as to the success of the government guayule program, saying, "I don't believe they can grow it at 50¢ a pound and make money out of it. But if it costs 50¢ we would like to have it while we need it."

He declared that he doubted the Salinas, Calif., plantations were abandoned by the development company in charge because rubber dropped to 4¢ per pound, but for the reason that guayule could not be successfully cultivated.

Mr. Jones estimated that the United States would receive 8,000 to 10,000 tons of guayule from Mexico in 1942 and said that not much would come from Africa or South America. There are facilities for reclaiming "untold quantities" of scrap rubber, he added, and the last ships carrying crude from the Far East are still coming in. Four large rubber companies will have an annual synthetic capacity of 590,000 tons of Buna S by 1944, and the remainder of the 700,000-ton synthetic program is divided between neoprene and Butyl types.

If material can be spared synthetic production may be increased beyond the 700,000 tons planned for 1944 to insure adequate transportation of workers to defense plants. Senator Burton, of the Truman Committee, declared such transportation essential to maintain war production at necessary levels, and Secretary Jones concurred. It is reported that plans for expansion beyond the 700,000-ton program are now under discussion in Washington.

Contract for Synthetic Rubber

Jesse Jones, Secretary of Commerce, announced that Rubber Reserve Co. and Defense Plant Corp. have made contracts and agreements with the principal oil, chemical, and rubber manufacturing companies which will bring the annual production of synthetic rubber to more than 700,000 tons. The plants will come into operation over the next 18 months, and if no unforeseen construction delays are encountered, all should be in production by the end of 1943.

The following companies will participate in the program:

Atlantic Refining Co., Carbide & Carbon Chemicals Co., Celanese Corp. of America, Cities Service Oil Co., Dow Chemical Co., E. I. du Pont de Nemours & Co., Inc., Firestone Tire & Rubber Co., B. F. Goodrich Co., Goodyear Tire & Rubber Co., Gulf Oil Co., Humble Oil Refining Co., Hycar Chemical Co., Koppers Co., Monsanto Chemical Co., Phillips Petroleum Co., Pure Oil Co., Richfield Oil Corp., Shell Union Oil Corp., Sinclair Refining Co., Socony-Vacuum Oil Co., Inc., Standard Oil Co. of Indiana, Standard Oil Co. of New Jersey, Standard Oil Co. of Louisiana, Texas Co., and United States Rubber Co.

Besides, there will probably be two or three groups of smaller rubber manufacturers that will be given contracts and supplied with raw materials from some of the above companies with which to manufacture rubber. The plants to be built by the rubber companies require less time to construct than facilities for the production of the raw materials.

Newhall Rubber Coordinator; Additional Restrictions on Rubber Goods; Other WPB Rulings

Appointment of Arthur B. Newhall as Coordinator for Rubber, with broad powers to direct and integrate all current programs dealing with the use, control, or production of natural and synthetic rubber, was announced March 31 by Donald M. Nelson, chairman of the War Production Board. Subject to the direction of the chairman, Mr. Newhall as Rubber Coordinator will:

1. Exercise general supervision over the work of the Rubber and Rubber Products Branch of the Division of Industry Operations, WPB;

2. Exercise general supervision over the work of the Synthetic Rubber Section of the Division of Materials, WPB;

3. Determine, whenever and to the extent he deems it necessary, policies and standards to govern priorities and allocations with respect to rubber, including both allocations as between essential civilian needs and other broad classes of demand and allocations among particular civilian needs;

4. Exercise general supervision over the activities of the Bureau of Industrial Conservation of the War Production Board relating to rubber, with particular reference to salvage, conservation, and substitution;

5. Coordinate and exercise general supervision over all work within the War Production Board relating to military or civilian specifications involving the use of rubber;

6. Coordinate the rationing of rubber tires and tubes by the Office of Price Administration with activities within the War Production Board relating to rubber;

7. Represent the chairman of the War Production Board in relation to the activities of the Reconstruction Finance Corp. or any subsidiary thereof, and the Office of the Petroleum Coordinator for National Defense, with respect to:

   (a) The provision of additional facilities for the production of synthetic rubber or any of the raw materials therefor;
   (b) The stockpiling of rubber;
   (c) The purchase or sale of rubber or rubber products;
   (d) The financing of additional production facilities, or of transactions in rubber or rubber products;

8. Coordinate measures for enlisting public support for the conservation and salvaging of rubber;

9. Inform himself concerning and keep in touch with the activities of all other government departments and agencies with respect to rubber;

10. In general, represent the chairman of the War Production Board with respect to all aspects of the rubber problem.

Mr. Newhall has been serving as chief of the Rubber and Rubber Products Branch, Division of Industry Operations. Before taking that post he was deputy director of the Division of Purchases, having served in that capacity since September 25, 1941. He is on leave from his position as executive vice president of Talon, Inc., Meadville, Pa.

Conservation Orders

To prevent a sharp increase in the use of rubber for closure purposes by manufacturers of foods which can no longer be packed in tin, the WPB on April 9 prohibited the use of rubber on containers for packaging more than 40 groups of products, effective in 30 days. This Conservation Order M-119 (see page 149) beginning 10 days from date of issuance prevents the purchase or use of any rubber product or compound for the manufacture of glass jar closures for the listed products, and manufacturers may not sell to packers any rubber closures unless the purchaser certifies they will not be used in violation of the order.

The regulations do not prevent the use of closures for products on the prohibited list if such closures were completely manufactured prior to the effective date of the order or within the 10-day grace period and if such closures are not usable for other products.

According to the Containers Branch, this exclusion of rubber closures will save about 300 tons of rubber a year, which will be increased as a result of further similar prohibitions to be made from time to time.

Rubber closure manufacturers are believed to have no more than one month's supply of materials on hand since only restricted allotments on a month to month basis have been made available to them.

The terms of the order do not apply to the manufacture, sale, delivery, or use of rubber closures for sealing glass containers designed to be shipped under the provisions of the Lend-Lease Act.

Stocks of rubber yarns and elastic threads were frozen in the hands of manufacturers and mills by a temporary order for 30 days beginning March 29. Conservation Order M-124 (see page 150) prohibited the sale, delivery, or purchase of rubber yarn or elastic thread, or the processing of such yarn in any way, except for defense orders, or as otherwise ordered by the Director of Industry Operations. The action was taken to conserve the supply of these yarns in the hands of manufacturers, knitting mills, and weaving mills, so that such yarns as are suitable for essential civilian needs may be allocated.

About May 1 an order replacing the M-124 regulations will be put into effect, restricting the use of suitable grades and types of elastic yarns in the hands of manufacturers and mills to Army, Navy, and essential civilian requirements.

Knitters, weavers, and other users of rubber yarn and elastic thread are permitted by Amendment No. 1, issued April 2, to Conservation Order M-124 to knit, weave, or otherwise use rubber yarn and elastic thread which, prior to 12:01 a.m., March 29, 1942, had been placed on a knitting machine, braider or loom, or which had been removed from the vendor's containers, wrapping, packing, or "put up" and placed on quills, cones, cops, spools, bobbins, tubes, beams, or warps prior to 12:01 a.m., March 29, 1942.

Ben Alexander, Acting Chief of the Textile, Clothing and Leather Goods Branch, on April 10 declared that, contrary to rumors, it is not contemplated to amend Conservation Order M-124 to release any rubber yarns for civilian use, for "these yarns are needed for military purposes and simply cannot be made available for civilian purposes."

New Rubber Restrictions

To save more than 1,000 tons of crude rubber and latex a month, WPB on March 30 amended Supplementary Order M-15-b, by Amendment No. 7 (see page 147), which reduces the permitted consumption of crude rubber or latex in more than 50 products and eliminates entirely the use of crude rubber or latex in about 20 products. The amendment also transfers more than 15 products from the lists which allow use of rubber up to certain percentages of a base period to lists of products for which manufacturers must have specific permission for the use of rubber or latex from the Rubber Branch of WPB.

The new list "A" of the order—that listing products for which crude may be used only up to certain percentages of the average monthly consumption for the year ended March 31, 1941—now contains 23 groups against the previous list of 31.

List B—products for which manufacturers must have specific permission—has been increased from 10 to 27.

Reductions in the permitted rates of consumption include the following:

Concentrator belts, industrial brake lining and clutch facings, polishing belts, and screen diaphragms, from 125 to 100%; cleats and bucket pads, last puller belts, pulley lagging, round belts, and streetsweeper belts, from 100 to 80%; acid, chemical, high-pressure, jetting and hydraulic, railroad, rotary drillers, and sandblast hose, from 125 to 100%; fire and mill hose, from 40 to 30%; hard rubber pipe and fittings, rubber buckets, pails, etc., rubber insulators, fume ducts, etc., for handling corrosive materials, rubber pumps, and rubber covered rolls (except wringers, printers, fingerprint, and business machines), from 100 to 85%; storage battery parts, hard rubber sheets, insulated tools, and magneto parts, from 125 to 80%; respirators, gas masks, mine safety battery and lamp parts, from 125 to 100%; chute linings, oil-well specialties, sheet, strip, and mechanical packings, and non-automotive vibration dampers, from 100 to 80%; automotive parts, 75 to 50%; electricians' gloves, 150 to 100%; mortuary gloves, 100 to 20%; surgical tape, 100 to 85%; automotive fan belts, 30 to 20%; and water bottles and syringes, 75 to 50%.

Among the products transferred from List A to List B (requiring application to the rubber branch for an allotment of crude rubber) are:

Commercial diving equipment; belt splicing and repair materials; elevator and conveyer belts; automotive V-belts; flat transmission and hog beater belts; rubber-lined tanks, drums and pipes; cable splicing compounds; loom pickers; feeding nipples; surgeons' gloves; press die pads; and cements for repairing and manufacturing shoes.

Completely eliminated from the use of crude rubber are:

Wire braid hose, brewers' hose, hatters' belts

and hat-forming bags, vacuum cleaner belts, switchboard mats and matting, wringer rolls, acoustic aids, hard rubber syringes, dental dam, and fountain syringes.

The revised order permits an increase from 80 to 100% in the consumption rate for gasoline, oil tank wagon, and sanitary hose.

Added to the permitted products are cement gun hose, grease gun hose, hydraulic control hose, and molded seals for dam and lock gates, 100%; molded cable connectors, and terminal blocks, 80%; and self-adhering gauze bandages and pneumatic truss pads, 50%. A new classification is set up for autopsy, mortuary gloves, and net-lined and all-rubber gloves for handling corrosive or severely abrasive materials at a 20% rate.

Changes in List C—products in which latex can be consumed only in specific percentages—follow:

Use in flat and round belts reduced from 85 to 75% in latex insulation for fume ducts, fans, racks, pumps, valves, etc., from 25 to 15%; in industrial rubberized fabric gloves for handling corrosives, from 50 to 20%. Transferred to List D—products which require permission for use of latex—are: feeding nipples, surgeons' gloves; non-automotive V-belts; and cements for manufacture of shoes. Completely eliminated from use of latex are: blood pressure bags; inhalation bags and face pieces (medical, surgical, etc.); operating cushions, sinus, and cautery bulbs; and compounds for treating tire cords.

On April 11 the WPB issued Amendment No. 8 (see page 148) to Order M-15-b prohibiting the manufacture of blowout shoes, regarded as an uneconomical form of tire repair, and restricting the manufacture of reliners, many of which are being used to repair tires on non-essential vehicles. The production of reliners for the balance of April was limited to a relatively small number, since production was small in the last quarter of 1941, the base period for the restriction.

It was also announced that the amounts of reclaimed rubber which may be consumed in the manufacture of reliners will be authorized directly by the Director of Industry Operations after April 30.

To provide retreading materials for a limited number of tires for workers in defense industries, the WPB on April 3 in Amendment No. 3 to Supplementary Order No. M-15-b-1 permits the manufacture of passenger-car capping stock entirely from reclaimed rubber together with a small quantity of crude for cushion stock. This provision formalizes the authorization for such manufacture made on March 21. (See page 146.)

The amendment also makes changes in the specifications for tires and camelback which allow manufacturers to shift the use of compounds between tread and friction within the over-all limits of crude rubber and reclaimed rubber allowed for a tire. Camelback may be made only in truck and bus sizes.

Two new specification lists were added to the order by the Amendment. One prohibits the use of rubber in the manufacture of many articles for the Army, even though the use of rubber may be called for by the Army purchase order or by Army specifications. This prohibition was issued at the request of the Army.

The other list is for hospital sheeting, defining the color, thickness, width, compound, and weight permitted.

Specifications governing the use of rubber as insulation on neutral electrical wires became effective May 1, under Amendment No. 4 to Supplementary Order No. M-15-b-1 (see page 146), which suspends the operation until that date of subsection (8) of List 12 of the order, which provided that "no rubber, latex, or reclaimed and scrap rubber shall be used as insulation on the neutral wire of a grounded neutral system" after April 11. The specifications for other types of insulating wire and cable remain in effect without changes.

New Committees

The Bureau of Industry Advisory Committees on April 17 announced formation of a Mechanical Rubber Goods Industry Advisory Committee, with C. S. Reynolds as government presiding officer. Committee members follow: Willard H. Cobb, United States Rubber Co., New York, N. Y.; F. M. Daley, Sponge Rubber Products Co., Derby, Conn.; J. E. MacDonald, Jr., Whitehead Bros. Rubber Co., Trenton, N. J.; K. H. Glanton, Dayton Rubber Mfg. Co., Dayton, O.; W. S. Richardson, B. F. Goodrich Co., Akron, O.; Franklin G. Smith, Ohio Rubber Co., Willoughby, O.; W. L. White, Raybestos-Manhattan, Inc., Passaic, N. J.; C. W. Yelm, Gates Rubber Co., Denver, Colo.; H. P. Schultz, Republic Rubber Co., Youngstown, O.; Paul H. Henkel, Continental Rubber Works, Erie, Pa.; D. E. Harpfer, Goodyear Tire & Rubber Co., Akron, O.; George L. Abbott, Garlock Packing Co., Palmyra, N. Y.; J. H. Hayden, Hewitt Rubber Corp., Buffalo, N. Y.; A. F. Matheis, Thermoid Co., Trenton, N. J.

The Automotive Battery Industry Advisory Committee follows: R. L. Vaniman, government presiding officer; A. J. Baracree, Am-Plus Storage Battery Co., Chicago, Ill.; Edward Becker, Merry-Bean Co., San Francisco, Calif.; G. W. Douglas, Douglas Battery Mfg. Co., Winston-Salem, N. C.; E. T. Foote, Globe-Union, Inc., Milwaukee, Wis.; A. Foster, Norwalk Tire & Rubber Co., Norwalk, Conn.; J. H. McDuffee, Electric Auto-Lite Co., Toledo, O.; B. F. Morris, Thomas A. Edison, Inc., Kearney, N. J.; Lester Perrine, Perrine Quality Products Corp., Waltham, Mass.; Arthur G. Phelps, General Motors, Anderson, Ind.; W. F. Price, Price Battery Corp., Hamburg, Pa.; L. B. Raycroft, Electric Storage Battery Co., Philadelphia, Pa.; G. W. Taylor, American Battery Co., Nashville, Tenn.

The Bureau of Industry Advisory Committees on February 28 announced formation of the Corset and Brassiere Manufacturers Industry Advisory Committee.

D. J. Hutchins, Detroit district sales representative of the Firestone Tire & Rubber Co., Akron, O., has joined the WPB Automotive Branch.

The technical subcommittee of the Technical Coatings Industry Advisory Committee in March 10 discussed further reduction in the use of strategic materials in paint manufacture as well as several new emergency alternate specifications.

Data on Critical Materials

The Bureau of Industrial Conservation on April 17 issued the second of a series of provisional reports on the relative scarcity of certain materials, divided into three groups. The first—materials most vitally needed for war purposes; not generally available for civilian needs—includes: chlorinated hydrocarbon solvents, chlorine, toluol, diphenylamine, formaldehyde, polyvinyl chloride, cashew nut shell oil, crude rubber and latex, chlorinated rubber, synthetic rubber, acetone, anhydrous ammonia, methyl methacrylate (sheets), phenol formaldehyde resins and plastics, phenol, tricresyl and triphenyl phosphates, phthalic anhydride and phthlates, polystyrene, urea formaldehyde plastic, cotton duck, nylon, palm oil, rapeseed oil, shellacs, and tung oil. Group 2—basic materials essential to the war industries, but the supply of which is not so critically limited as materials in Group 1—includes: barium carbonate, carbon tetrachloride, glycerine, natural gas, natural resins, except rosin, rayon, reclaimed rubber, zinc (low grades), glues (animal and vegetable), benzine, butanol, cocoanut oil, cork, cotton (raw, long staple), glycols, methyl methacrylate (powder), titanium pigments, vulcanized fiber. The third group—materials available in significant quantities for other than strictly war purposes—includes: asphalt, clay, coal and coke, sulphur, lime, wood flour, aqueous ammonia, cottonseed oil, crude oil, paraffin, plastics, soy beans and products (protein oil), asbestos (common), carbon black, casein, coal tar pitch, cotton (raw), diatomite, gilsonite, cellophane, lactic acid and lactates, linseed oil, lignin plastic, mica (common) salt, gasoline, lubricating oil, resin and derivatives, starch, turpentine. These groupings, of course, are subject to change.

The WPB recently reported that as a result of requisitioning large quantities of certain commodities and seizure of the cargo of an Axis ship, to secure critical materials for war uses by government agencies, up to March 25 the following were among the materials obtained: 2,348 tons of rubber and approximately 1,640 tires and tubes.

The WPB on February 26 gave several facts on automobile conversion to show the need of car rationing. Thus, for every 24 automobiles we are *not* making this year we have saved steel and rubber for a 27-ton medium tank.

Other Orders

Conservation Order No. M-56, issued and effective April 15, prohibits the use of natural resins in certain products and restricts their use for other purposes in any calendar quarter to 50% of the amount used in the corresponding quarter of 1941.

Amendment No. 4 (March 2, 1942) to

Limitation Order L-1-a to Further Restrict the Production of Medium and Heavy Trucks, forbids further construction of medium trucks after completion of February quotas, to save large quantities of critical materials, especially rubber and steel.

Amendment No. 5 to General Limitation Order L-1-a, issued and effective April 2, authorized heavy truck producers to use up fabricated materials on hand February 28 for war orders. These vehicles must be produced without tires, and the war agency ordering them must supply tires, casings, and tubes from their own stocks.

Supplementary General Limitation Order L-1-c, issued and effective April 11, stops all production of medium and heavy trucks for civilian use after existing quotas have been completed.

Order L-20, relating to the use of cellophane and similar transparent wrappings for packaging, which was to have expired March 17, has been extended indefinitely, with certain minor changes made.

Amendment No. 1 to General Limitation Order L-26-a, issued April 21, prohibits production of farm machinery and equipment requiring rubber tires, except for combine harvester-threshers, after April 30. Production of combines requiring rubber tires must cease after July 31.

General Limitation Order L-37 (February 17, 1942), to Restrict the Production of Musical Instruments, sharply curtails in the manufacture of all such instruments and accessories the use of critical materials, including rubber, copper, phenol formaldehyde plastics, neoprene, and cork.

The WPB has also issued several orders relating to fire fighting equipment. General Limitation Order No. L-39 to Prevent Unnecessary Consumption of Scarce Materials in the Production of Fire Protective Equipment (February 24, 1942) restricts the use of certain materials, including rubber and synthetic rubbers, except under certain conditions, as: crude rubber for diaphragms or gaskets for dry valves on sprinkler systems and reclaimed rubber for hose for fire extinguishers; and synthetic rubber other than neoprene, to the extent essential to efficient functioning. The order also limits the production of foam and anti-freeze extinguishers. General Limitation Order No. L-43 to Prevent Unnecessary Consumption of Scarce Materials in the Production of Motorized Fire Apparatus (February 27, 1942) limits, among other materials, the use of synthetic rubbers other than neoprene to valve and pump packings and hydraulic hose and fuel pump lines.

Amendment No. 1 to General Limitation Order L-43, issued and effective April 15, prohibits the use of rubber tires on auxiliary trailers for fire apparatus manufactured or delivered after the effective date of the order.

General Conservation Order L-50 (March 3, 1942) to Limit the Use of Scarce and Critical Materials by the Wire Telephone Industry, drastically limits the future engineering practices of telephone companies and their plans

WPB Rubber Priorities Orders in Force

Subject	Order No.	Related Form	Issued	Exp. Date
a. To conserve supply and direct distribution	M-15	PD-49, 49a	6-20-41	12-31-41
1. Determines quotas	M-15 Amend. No. 1	.....	8-4-41	.....
2. Restricting production of white sidewall tires	M-15 Amend. No. 2	.....	8-8-41	.....
3. Clarification of reports to be filed	M-15 Amend. No. 3	.....	11-12-41	.....
4. Supplementary order explaining July quota	M-15-a	.....	6-27-41	7-3-41
5. General restriction of the use of rubber	M-15-b	.....	12-11-41	12-22-41
6. Reduces civilian rubber goods output to essentials	M-15-b Amend. No. 1	.....	12-19-41	1-5-42
7. Permission granted for manufacture of first extinguishing apparatus and clarifies manufacture of rubber heels and soles	M-15-b Amend. No. 2	.....	12-27-41	.....
8. Prohibits sale, trade, or transfer of crude rubber latex or compound liquid latex without permission of WPB. Non-essential products restricted to reclaimed rubber List A amended	M-15-b Amend. No. 3	.....	1-20-42 (Eff. 2-1-42)	.....
9. Drastic tire rationing plan	M-15-c (Eff. 1-5-42)	PD-3, 216	12-27-41	.....
10. Further restrictions and transactions of rubber tires, tubes, and casings	M-15-c Amend. No. 1	.....	1-2-42	.....
11. Persons possessing certificate may purchase new tires and tubes providing lease was in effect Dec. 11, 1941.	M-15-c Amend. No. 2	.....	1-3-42	.....
12. Sales of new tires, tubes, or casings to foreign governments under Lend-Lease, subject to restrictions, allocations, and quotas	M-15-c Amend. No. 3	.....	1-20-42	.....
13. Modifies sales prohibition on specified sizes and subjects truck tires for ten-year-old vehicles to full restrictions	M-15-c Amend. No. 4	.....	1-15-42	.....
14. Further clarifications of restrictions concerning transactions and new tires, tubes and casings	M-15-c Amend. No. 5	.....	1-21-42 (Eff. 1-28-42)	Until revo.
15. Permits recappers and retreaders to purchase replacements for inner tubes as substitutes for airbags	M-15-c Amend. No. 6	.....	2-9-42 (Eff. 2-13-42)	.....
16. Lists specifications for certain rubber products	M-15-b-1	.....	2-11-42	.....
17. Amends restrictions on "transfer" of tires, provided no change in ownership results.	M-15-c Amend. No. 7	.....	2-16-42	.....
18. Makes available certain scrap rubber for less essential civilian items.	M-15-b Amend. No. 4	.....	2-19-42	.....
19. Substitutes four new lists of permitted products and uses	M-15-b Amend. No. 5	.....	2-28-42 (Eff. 3-1-42)	.....
20. Controls use and sale of scrap and reclaimed rubber	M-15-b Amend. No. 6	.....	3-20-42	.....
21. Revises specifications for footwear, tires, tubes, and flaps.	M-15-b-1 Amend. No. 1	.....	3-25-42	.....
22. Lists specifications for wire and cable	M-15-b-1 Amend. No. 2	.....	3-25-42	.....
23. Corrections	M-15-b-1	.....	3-28-42	.....
24. Reduces consumption of crude rubber or latex in more than 50 products, and eliminates their use entirely in more than 20 products	M-15-b Amend. No. 7	.....	3-30-42	.....
25. Changes specifications for tires and camelback, provides retreading materials for defense workers' tires, and adds two new specifications lists	M-15-b-1 Amend. No. 3	.....	4-3-42	.....
26. Prohibits use of rubber on containers for packaging more than 40 groups of products	M-119	.....	4-9-42	.....
27. Prohibits manufacture of blowout shoes and restricts manufacture of reliners.	M-15-b Amend. No. 8	.....	4-11-42	.....
28. Specifications governing use of rubber as insulation on neutral electrical wires effective May 1	M-15-b-1 Amend. No. 4	.....	4-11-42	.....
b. Chlorinated rubber to conserve supply and direct distribution	M-46	PD-143, 144	10-29-41	7-31-42
1. To conserve supply and direct distribution by freezing all stocks except those used for specified purposes	M-46 Amend. No. 1	.....	2-23-42	Until revo.
c. Neoprene, to direct distribution	M-4, M-4-a through M-4-n (Superseded by M-13)	PD-7, 36	.....	Expired
d. Synthetic rubber	M-13	PD-7, 33, 36	6-9-41	12-31-41
1. Direct allocation	M-13 Amend. No. 1	.....	12-31-41	Until revo.
e. Rubber working machinery suspends production and delivery of tire retreading and recapping equipment except on preference-rated orders	L-61	PD-1A	3-11-42	Until revo.
f. Rubber yarn or elastic thread, conservation order	M-124	.....	3-28-42	.....
1. Knitters, weavers and other users permitted to use rubber yarn and elastic thread by meeting certain requirements	M-124 Amend. No. 1	.....	4-1-42	.....

for betterment and relocation of plant facilities and also curtails installations of luxury types of telephones. By this program it is expected to save large amounts of critical materials annually, such as 540 tons of rubber.

General Limitation Order L-57 (March 3, 1942) to Restrict the Production of Unapproved Gas Masks and Anti-Gas Devices, prohibits manufacture or sale of gas masks and anti-gas devices unless they are actually on order by government agencies and built to Army Chemical Warfare Service specifications. The order also forbids the delivery or sale of several materials for use in unapproved masks, including laminated cloth, rubber, synthetic rubber, webbing, or duck.

General Limitation Order L-73, March 28, 1942, prohibits manufacturers of office supplies from using specified metals or crude rubber unless already processed beyond the first stage of cutting or stamping.

General Limitation Order L-84, effective April 4, restricted production of electric heating pads and prohibited the use of rubber and other critical materials in them. Amendment No. 1 to the order, issued and effective April 15, stops production of electric heating pads entirely June 30. Prior to that date manufacturers may consume any materials in inventory on April 4 which had been fabricated to such an extent that they cannot practically be used for any other purpose than heating pads.

General Limitation Order L-100, issued and effective April 17, prohibits the placing or acceptance of orders for compressors covered by the regulations unless specific authorization is made on Form PD-420. Heavy compressors are needed in synthetic rubber and other vital production.

General Preference Order M-41, which limits the use of chlorinated hydrocarbon solvents, originally scheduled to expire March 31, has been extended to May 15.

General Preference Order No. M-57 was amended April 15 to include oiticica oil under the restrictions applying to tung oil for which it is a substitute.

General Preference Order No. M-91 to Conserve the Supply and Direct the Distribution of Cotton Duck, effective February 28, 1942, allocates the bulk of the nation's output of cotton duck to the Armed Services and the remainder to essential civilian needs. Schedule A at the end of the order lists products to be manufactured from cotton duck, including air drill and acid hose, belting, packing, and certain other mechanicals, filters, and tire chafer fabrics.

Order M-137, effective on the date of issuance, April 20, bans the use of benzene in motor fuel with the exception that any producer or distributer may use within the next 30 days (from date of issuance) one-sixth of the amount used in the quarter ended March 31. Benzene is a principal source of styrene, an important ingredient used in the manufacture of Buna S. Increased demands of benzene for both fuel and synthetic rubber cannot be met, but the order specifically exempts the use of benzene in the production of aviation fuel with an octane rating higher than 87.

Priorities Regulation No. 7, February 17, 1942, allows, under specified conditions, the use of a facsimile signature for endorsements evidencing preference ratings. Amendment No. 1 (February 25, 1942) of Priorities Regulation No. 3 postponed from March 2 to March 15 the date on which PD-1A and PD-3A forms must be used in place of forms PD-1, PD-3, PD-4, and PD-5.

Interpretation No. 3 of Preference Rating Order No. P-100 was amended April 16 to exclude as "operating supplies" granted an A-10 preference rating, uniforms and fire hose.

Supplementary Directive 1D (February 5, 1942) delegates to the OPA the authority to ration the sale, transfer, or other disposition of used typewriters and limited quantities of new typewriters. Deliveries of new and used typewriters, with certain exceptions, were frozen by the WPB beginning March 6, under General Limitation Order L-54, pending issuance of rationing plans by the OPA, which were announced March 14.

OPA Rulings

Amendment No. 3 to the Revised Tire Rationing Regulations contains authorizations for necessary transfers under the Tire Return Plan,[1] announced February 27, 1942, whereby dealers and jobbers may sell stocks of new passenger-car tires and tubes back to manufacturers and mass distributers.

Amendment No. 4 (issued April 4 and effective April 10) to Revised Tire Rationing Regulations grants authority whereby retreaders and recappers will be able to get initial allotments of camelback for passenger-car tires and local rationing boards may issue certificates for purchase of new tubes for List B passenger cars and trucks. The amendment also prohibits the application of truck-type camelback to tires to be used on passenger cars and the application of passenger-type to truck tires.

Amendment No. 5 covers making available to long-distance bus and truck operators emergency reserves of tires and tubes for quick replacements of blowouts.

Amendment No. 6 revises eligibility classification for use of tires.

Establishment of ceiling prices for remolded tires at the same levels as those applying to regrooved tires in Maximum Price Regulation No. 107—Used Tires and Tubes—was announced March 27 in Amendment No. 1 to No. 107. The amendment, effective March 31, brings regrooved truck tires under the price ceilings by correcting a typographical error through which the caption "regrooved tires" was omitted from one of the column headings in Table 1-B, which sets forth the maximums for used truck tires.

The OPA has no objection to issuance of purchase certificates for new tires of obsolete sizes to List B vehicle owners who have changed wheels and rims to permit use of those sizes instead of the recapped casings that otherwise would be the only kind available to them.

The extremely serious rubber situation necessitated allocating tire recapping material made almost wholly of reclaimed rubber for use on List B passenger cars during April, OPA Acting Administrator Hamm said March 28. The camelback which went to retreading shops for use in meeting requirements under certificates issued to List B passenger car operators in April was made of reclaimed rubber with only about 2% of new crude used in the mixture for cohesion.

"Tires recapped with this lower grade camelback should be driven at speeds no greater than 35 miles an hour," Mr. Hamm said.

Retreaded or recapped passenger car tires "frozen" in the hands of retreaders since February 19 may be released to any of their owners who can qualify for retreading certificates, according to instructions sent state rationing administrators on April 17. The instructions also outline procedure to be followed by applicants who wish to get certificates for recapping tires they had left in retreading shops, but which were not retreaded prior to February 19, when all retreading and recapping was ordered temporarily discontinued.

Retreaders and recappers entitled to an initial allotment of truck camelback who did not apply for it before March 1 deadline may get their allotments on a showing of valid reason for failure to apply before expiration of the time limit, it was announced April 1. Those who because of lack of notice or other legitimate reason did not make application should file with their local board, besides the regular OPA form, an affidavit stating the reason for the delay. If the local board accepts the reason as valid, it may issue a certificate for the initial allotment.

Farm tractors originally fitted with steel wheels, which have changed to rubber tires will not be granted certificates for tires whenever available steel wheels can be put back into service, state rationing administrators were informed April 6 in a letter from the OPA. The letter stated, however, that where the vehicle is already on rubber tires and no substitute wheels are available, certificates may be issued. The Revised Tire Rationing Regulations already provide that no tires may be released for converting a farm tractor from steel wheels to rubber.

Tires will be made available to defense workers only when they cannot get to work without them the OPA announced April 7. Another announcement that day read that purchase certificates for tires to replace mud and snow tires now on vehicles may not be issued by rationing boards except under conditions

[1] For details see India Rubber World, Apr. 1, 1942, p. 66.

that ordinarily govern issuance of certificates.

OPA Seeks Scrap Industry Data

Spot checks at the establishments of New England scrap peddlers, dealers, and brokers will be conducted by the OPA to secure supply and movement data on rubber and other scrap materials, Mr. Henderson announced April 15. Beginning April 27 the survey will be made over a period of three or four weeks of 35 or 40 OPA representatives in selected areas. Analysis of the information gathered is expected to give a comprehensive picture of the scrap industry in the northeastern states. Surveys in two or three other areas may be made later.

Legal Actions

Charles L. Hart, president of the La Salle Motor Sales Corp., Boonville, Ind., was sentenced April 17 to 18 months in jail and fined $500 for a violation of OPA tire rationing regulations. Russell W. Baker, secretary-treasurer of the same company, received a suspended sentence of one year and a day in jail and a $250 fine, and was placed on three years' probation. The company was fined $1,000. The defendants had admitted concealing large quantities of new tires from the company's stock, filing a false inventory of stocks with the Bureau of Internal Revenue, and falsifying the dates of a promisory note covering tires removed to the Boonville Mills on January 15.

Charles S. Kay, manager of the Kay Rubber Co., Philadelphia, Pa., was recently indicted in a United States District Court charged with violating the price schedule on new tire sales and falsifying records.

A Los Angeles, Calif., federal grand jury returned an indictment on April 1 charging Guy O. Bryan, a tire dealer, and five other persons with conspiracy to violate tire rationing regulations through the retail sale of new tires and tubes to consumers without certificates from local rationing boards.

Other News

Enforcement provisions of the Emergency Price Control Act of 1942 are formally incorporated in 96 OPA maximum price schedules in an order issued March 16. All the schedules involved were issued before February 11, 1942, when Leon Henderson took office as Price Administrator under the Price Control Act and, hence, contained enforcement sections which did not describe the sanctions provided in the new law. These original enforcement sections are now superseded.

The OPA has announced that willful violations of the rationing orders and regulations which it issues now face direct prosecution and severe penalties under provisions of the Second War Powers Act, 1942, signed by the President and effective March 28. The Act provides a maximum penalty of $10,000 fine and imprisonment for one year for willful violation of priority orders of the War Production Board or of the rationing orders or regulations of the OPA, whether already in effect or issued in the future.

Manufacturers of all sporting goods and hunting and fishing equipment have been requested not to advance prices beyond those in effect January 10, 1942. It is also expected to keep retail prices as well at that level.

The OPA on March 13 to halt a rapid and unwarranted rise in prices of finished piece goods made of cotton, rayon, and their mixtures, imposed a temporary price regulation setting maximum prices at levels no higher than those prevailing between March 7 and 11, 1942. (Temporary Maximum Price Regulation No. 10, Finished Piece Goods Made of Cotton, Rayon, and Mixtures Thereof.)

Mr. Henderson has stated that buyers themselves can do much to check profiteering on rubber products by watching prices and withholding purchases in cases where advances appear excessive or unwarranted.

1940 Advisory Commission Report

The recently released report of the Advisory Commission to the Council of National Defense, headed by E. R. Stettinius, Jr., made October 23, 1940, estimated annual rubber requirements in the event of an emergency at 700,000 long tons of crude and 210,000 tons reclaim. On the basis of data concerning crude rubber stocks, stockpile plans, reclaim capacity, and the then-current status of the synthetic industry, the Commission recommended that steps be taken as rapidly as possible to increase the annual production of synthetics to 100,000 tons. But the Committee was not in full agreement as to whether financing of the program should be borne partially by the industry or totally by the government. At that time the situation in the Pacific was not sufficiently clarified as to possible future interruption of supplies of natural rubber from the Far East.

The Office of Exports of the Board of Economic Warfare, Washington, D. C., announced that effective April 9 all rubber and rubber manufactures may be shipped to Canada under general license. The Canadian Customs will henceforth require, in addition to import permits, invoices stating crude rubber content. On April 10 the Exports Office restricted exportation under general license of footballs, basketballs, baseballs, golf, tennis, and other balls to Canada, Great Britain, Northern Ireland, Newfoundland, Greenland, Iceland. For these items individual licenses for exportation to all other destinations will be required. Effective April 15 raw, latex, scrap, waste, reclaimed, and synthetic rubber and rubber tires and tubes were added to the blockade control list. Exportation to Spain of such materials will require a blockade control permit.

New Rubber Committee

Jesse Jones, Secretary of Commerce, on March 29 announced the formation of an advisory committee from the rubber industry to work with the Rubber Reserve Co. in stimulating the production of natural rubber in South and Central America and Africa to whatever degree possible. The committee consists of: chairman, Paul Litchfield, Goodyear Tire & Rubber Co., Harvey Firestone, Firestone Tire & Rubber Co., John Collyer, B. F. Goodrich Co., F. B. Davis, United States Rubber Co.; and A. Johnston, Ford Motor Co.

Goodyear, Goodrich, Firestone, and Ford have all had extensive experience in cultivating rubber for their own companies and will contribute this experience to the government.

The committee met March 29 with officials of the RFC, the State Department, and Department of Commerce, for a preliminary discussion of the problems.

Federal Trade Commission, Washington, D. C., issued an order to cease and desist from unfair and deceptive acts and practices in the sale of electrical devices against Frank G. Huntington and Herman Pusterhofer, trading as Euclid Rubber & Mfg. Co., 19730 Tyronne Ave., Cleveland, O. Findings of the Commission are that the respondents misrepresented their products as having been approved by Underwriters' Laboratories, Inc., Electrical Testing Laboratories, and Hydro-Electric Power Commission of Ontario, and circulated disparaging statements concerning a competitor. Under the order the respondents are directed to cease and desist from representing that any of their products have been tested or approved by any organization when such is not a fact, and to discontinue disparaging any competitor, by representing that its manufacturing facilities or the size and scope of its business are less than is the fact, or by making other false representations with respect to any competitor or its business operations.

The case as to Louis Walton and Joseph Pusterhofer, who were included among the respondents named in the complaint, was closed by the Commission without prejudice to its right to resume proceedings should future facts warrant. According to the findings, the identity of Walton was not established, and Joseph Pusterhofer was not shown to have been connected with Euclid Rubber & Mfg. Co. for more than five years.

Charles B. Henderson, chairman, Reconstruction Finance Corp., Washington, D. C., told the American Bankers Association Credit Clinic at Chicago, Ill., April 17, that the Rubber Reserve Co. has to date contracted for over $875,000,000 for crude rubber. Rubber costing $292,000,000 has been actually received or is in transit. Contracts for synthetic rubber production amount to about $650,000,000.

BEW Expanded

Executive Order 9128, reprinted below, defines additional functions and duties of the Board of Economic Warfare, which indicates that the purchase and importation of rubber and other strategic materials will now be handled by the BEW instead of the Reconstruction Finance Corp.

By virtue of the authority vested in me by the First War Powers Act, 1941, approved December 18, 1941 (Public Law 354, Seventy-Seventh Congress), and the Act of March 11, 1941 (Public Law 11, Seventy-Seventh Congress), as President of the United States and Commander in Chief of the Army and Navy, it is hereby ordered as follows:

1. In addition to the responsibilities and duties heretofore conferred, the Board of Economic Warfare is authorized and directed to:

a. Receive and be responsible for executing directives from the Chairman of the War Production Board as to quantities, specifications, delivery time schedules, and priorities of materials and commodities (other than arms, munitions, or weapons of war as defined in the President's Proclamation of May 1, 1937, as amended) required to be imported for the war production effort and the civilian economy; and determine the policies, plans, procedures, and methods of the several Federal departments, establishments, and agencies with respect to the procurement and production of such materials and commodities, including the financing thereof; and issue such directives, or initiate such proposals in respect thereto as it may deem necessary.

b. Direct, with the approval of the President, the creation, organization, and financing of a corporation or corporations, pursuant to subsection 3 of the fourth paragraph of sections 5(d) of the Reconstruction Finance Corp. Act, as amended, the objects and purposes of which shall be:

(1) To obtain from foreign sources such materials, supplies, and commodities (other than arms, munitions, or weapons of war as defined in the President's Proclamation of May 1, 1937, as amended) as are necessary for the successful prosecution of the war, and provide for the production, delivery, sale, or other disposition thereof; and

(2) To take such other action as may be deemed necessary to facilitate the war effort and strengthen the international economic relations of the United States.

Advise the State Department with respect to the terms and conditions to be included in the master agreement with each nation receiving lend-lease aid under the Act of March 11, 1941, entitled "An Act Further to Promote the Defense of the United States and for Other Purposes," and Acts amendatory or supplemental thereto.

d. Provide and arrange for the receipt by the United States of reciprocal aid and benefits (other than arms, munitions, or weapons of war as defined in the President's Proclamation of May 1, 1937, as amended) from the government of any country whose defense shall have been determined by the President to be vital to the defense of the United States pursuant to the Act of March 11, 1941 (Public Law 11, Seventy-Seventh Congress), and determine the terms upon which such aid and benefits shall be received, including the authorization of other governmental agencies to receive such aid and benefits.

e. Represent the United States Government in dealing with the economic warfare agencies of the United Nations for the purpose of relating the Government's economic warfare program and facilities to those of such nations.

2. For the purpose of carrying out its responsibilities, the Board of Economic Warfare may arrange through the Department of State to send abroad such technical, engineering, and economic representatives responsible to the Board as the Board may deem necessary.

3. The responsibilities, duties and powers transferred to and conferred upon the Board of Economic Warfare by this Order may be exercised and performed by the Chairman of the Board, or by the Executive Director of the Board, or such other officials or employees as the Chairman may designate.

4. Executive Orders No. 8839 of July 30, 1941; No. 8900 of September 15, 1941; No. 8982 of December 17, 1941; No. 8926 of October 28, 1941, are amended accordingly; and any provisions of these or other pertinent Executive Orders conflicting with this Order are superseded.

FRANKLIN D. ROOSEVELT

The White House
April 13, 1942

With Our Armed Forces

Among those of the rubber industry who are now in military service are:

Donald E. Cable, from the General Laboratories of the United States Rubber Co., now a captain in the Chemical Warfare Service.

W. W. Crawford, sales representative of the Columbia Chemical Division of the Pittsburgh Plate Glass Co., with the Commodities Division, Resources Branch, Office of Procurement and Material, Navy Department.

Leonard K. Firestone, president of the Firestone Aviation Products Co., now a lieutenant in the Navy.

Raymond C. Firestone, president of the Firestone Tire & Rubber Co. of Tennessee, now in the field artillery of the Army.

Roger S. Firestone, president of the Firestone Rubber & Latex Products Co., in the Navy.

Laurence Lisle, executive assistant, Davol Rubber Co., lieutenant junior grade, Naval Reserve.

Wilson B. McCandless, president, Denman Tire & Rubber Co., lieutenant commander in the Navy.

David C. Scott, Jr., of Henry L. Scott Co., in the Navy.

The Marine Corps, it is reported, is buying sterilizing water bags in which a synthetic waterproofing compound has been used instead of rubber.

Jesse Jones, Secretary of Commerce, announced April 8 the signing of an agreement between Export-Import Bank of Washington, D. C., the Republic of Cuba, and Comision de Fomento Nacional, an agency of the Cuban Government, with respect to the $25,000,000 credit authorized in May, 1941, to finance agricultural development and diversification and public works throughout the Island of Cuba, each project to be approved by the Bank.

The United States Treasury Department, Washington, D. C., has reported that the new 1941 excise tax on rubber articles yielded $3,711,524.11 in January, 1942. Collections of tires and tubes, including floor taxes, totaled $8,945,949.49 in January, against $2,377,578.36 in January, 1941.

The Business Advisory Council, Washington, D. C., organized in 1933 as purely an advisory body without statutory authority or administrative responsibility, with members serving on a voluntary basis for one year at the invitation of the Secretary of Commerce, lists among its new members for 1942, Cyrus S. Ching, director of industrial and public relations, United States Rubber Co., New York, N. Y.; and John L. Collyer, president, B. F. Goodrich Co., Akron, O.

Federal Reserve Bank, New York, in a survey of 899 commercial and industrial corporations, reported that net profits for 1941, despite higher wages, material costs, and taxes, were 17% above the 1940 figure and 18% higher than in 1937. Included were nine rubber and tire corporations with total net profits as follows: for 1937, $26,500,000; 1940, $38,900,000; 1941, $49,700,000.

American Petroleum Institute, 50 W. 50th St., New York, N. Y., has appointed as a vice chairman of its 1942 Central Committee on Automotive Transportation, Fred B. Hufnagel, Jr., of Sun Oil Co., Philadelphia, Pa. J. A. Ritter, also of Sun Oil, is a member of the Institute's Division of Production Central Committee on Measuring, Sampling, and Testing Natural Gas and Natural Gasoline. On the 1942 Committee on Railroad Transportation are P. L. Howard, of Sun, and A. F. Winn, of Skelly Oil Co., Kansas City, Mo.

Rubber and Canvas Footwear Statistics

	Thousands of Pairs		
	Inventory	Production	Shipments
1938	16,183	50,812	54,942
1939	16,388	60,612	60,377
1940	11,129	57,278	62,480
1941	9,170	72,217	74,080
1942			
Jan.	8,310	5,545	6,306
Feb.	7,907	4,753	5,213

Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.

EASTERN AND SOUTHERN

Osberg Resigns as Executive Editor

Edward V. Osberg, who has been a member of the editorial staff of INDIA RUBBER WORLD since 1937, most recently as Executive Editor, has resigned, as of May 1, to become vice president of the Wilmington Chemical Corp., Wilmington, Del. He will make his headquarters at the New York offices of the company at 10 E. 40th St.

Mr. Osberg has had wide experience in the rubber field and is particularly well qualified for his new position. He received his education at Brewster Academy, Wolfeboro, N. H., and Brown University, Providence, R. I., where he majored in chemistry. Later he took a special course in colloidal chemistry at Massachusetts Institute of Technology under Dr. Ernst A. Hauser.

In 1930 Mr. Osberg became associated with the Simplex Wire & Cable Co. as assistant rubber research chemist and later became chemist in charge of the development and application of latex to insulated wire.

In his new position Mr. Osberg will continue on the staff of INDIA RUBBER WORLD as Technical Consultant.

While deeply regretting the loss of his services as Executive Editor his associates on the staff appreciate the opportunity for broader work that has come to Mr. Osberg and wish him a full measure of success in his new venture.

Jenkins & Guillo, Inc.

E. V. Osberg

Substitutes for Rubber Film Wrappings Shown at Packaging Exposition

Substitutions of materials to conform to restrictions of the War Production Board, which among other things bans the use of rubber film for food wrapping, were featured at the Twelfth Annual Packaging Exposition held under the auspices of the American Management Association at the Astor Hotel, May 14 to 17. One such material is an extra-heavy cellophane, waterproof and impervious to 5% acid.

The Goodyear Tire & Rubber Co. exhibited attractive Pliofilm packagings of meat, cheese, vegetables, fruits, shelled nuts, coffee, tobacco, candy, gum, clothing and accessories, as well as a hood seal for milk bottles. But currently Pliofilm is used for war purposes only. Such uses include coverings for airplane motors as moisture protection from factory to field. Monsanto Chemical Co. showed molded articles of Lustron (polystrene), balloon cloth of polyvinyl butyral, and samples of Saflex, a vinyl resin, on a duck backing used as waterproofing for military purposes. Adhesives made from domestic raw materials to replace latex were among the display of the Arabol Mfg. Co. E. I. du Pont de Nemours & Co., Inc., showed tin cans in which the seams, made without latex, were laminated with cellophane to add strength to the crimp on the body of the can.

At the three-day conference covering all phases of wartime packaging problems, L. K. Harper, vice president, Sardik Food Products Corp., said in part; "There is no entirely satisfactory substitute for either the tin or rubber and foil package. Several materials show promise, but sufficient tests have not been made to be certain."

The army, he stated, wished to eliminate the use of Pliofilm and other packaging products containing rubber until the rubber situation is eased. The extent to which dehydrated fruits and vegetables will be used commercially may depend upon how good a substitute can be developed from non-defense materials.

"If there is no other answer to the problem of proper preservation of dehydrated foods except the use of pressure materials such as tin and rubber, these materials will still have to be used in relatively small amounts," Mr. Harper said.

The Eleventh Annual All-America Package Competition, sponsored recently by *Modern Packaging Magazine*, 122 E. 42nd St., New York, N. Y., gave four top awards to packages using Pliofilm: C. B. Thomas, Minneapolis, Minn., for its Master Blend Cheese Spread, in the first circular Pliofilm-package out; Cudahy Packing Co., Chicago, Ill., for its new Pliofilm Mil-O-Seal Casing package for meat loaves and cooked hams; to Kingan & Co., Indianapolis, Ind., Tasti-Square Package for square-cornered loaf-type meat product specially developed to suit the package; and to Thebest Mills Co., New York, which has its Beautiform Swim Suit merchandised in a Pliofilm drawstring bag that may be used afterwards for carrying the suit and incidentals to and from the beach.

Whittaker, Clark & Daniels, Inc., manufacturer, importer, and exporter of minerals, colors, and pigments, 260 W. Broadway, New York, N. Y., at the annual election of officers March 25 made Clarence E. Clark president. Mr. Clark, who had been vice president, succeeds his father, the late Samuel H. Clark. Other officers elected are: Harold G. Robinson and W. Wallace Roff, vice presidents; John A. Franklin, secretary-treasurer; John A. Seidler, assistant secretary; and L. E. Clark, assistant treasurer.

Irvington Varnish & Insulator Co., Irvington, N. J., according to Vice President W. F. Hoffmann, Jr., has erected a plant at Fortaleza, Brazil, for the extraction of phenols from the shells of cashew nuts. Efforts, however, are still in the experimental stage, as the Brazilian cashew crop has never been exploited and as the production of shell liquid has never been considered in any light other than as a by-product of kernel production. The company has not seriously considered any plan for the recovery of kernels, other than as a glycerin source, and none will be considered until the shipping situation clears up.

Crown Cork & Seal Co., Baltimore, Md., and subsidiaries plan to spend about $2,619,000 for plant construction in 1942.

Texas Defense Industries, Inc., 1015 W. T. Waggoner Bldg., Fort Worth, Tex., was incorporated February 19, 1942, to conduct a non-profit organization for the support of a scientific enterprise—research in the production of materials used for national defense, with present interest mainly on rubber. Officers include: Fred F. Florence, chairman of the board; Maco Stewart, president; John F. Camp, executive vice president; E. B. Germany, C. M. Malone, and R. E. Harding, vice presidents; and Reuben Williams, secretary-treasurer.

Inflatable Tube Holds Barrel during Loading

A heavy, flanged, inflatable rubber tube, described as the "Swell Grip", is used for holding barrels, kegs, or drums to loading spouts and is said to provide a firm, dust-proof grip. The tube is placed around the mouth of the spout, and the barrel to be filled is fitted over it. The tube is then inflated, and in swelling it grips the upper inside portion of the barrel. Working conditions are claimed to be improved, particularly where the compounds being packed are injurious to the health of workers. The "Swell Grip" can reportedly support weights up to 300 pounds. Arkell Safety Bag Co.

REMOVAL NOTICE

On and after May 1, 1942, the office of

INDIA RUBBER WORLD

and all other Bill Brothers publications will be located at

386 FOURTH AVE., NEW YORK
(CORNER OF 27TH ST.)

The telephone number will be the same as at present
MOhawk 4-1760

Wilmington Chemical Expands

Wilmington Chemical Corp., 10 East 40th St., New York, N. Y., announces that the production of Naftolen, the firm's extender for crude rubber, synthetic rubber, and reclaim, is to be increased 2,500 tons by the end of this year. The first unit of the new plant, now under construction, is expected to be in production in June. Facilities are being provided for further rapid expansion. The plant and the laboratory of the firm are located in Wilmington, Del.; while the executive offices are in New York. Officers of the company are: Herbert Waller, president; Hubert I. du Pont and E. V. Osberg, vice presidents; M. A. Solmssen, treasurer; and Lucien B. Carpenter, secretary. F. S. Rostler is chief chemist.

John M. Ball, editor of *The Vanderbilt News*, publication of R. T. Vanderbilt Co., Inc., 230 Park Ave., New York, N. Y., has accepted an appointment with the War Production Board in Washington, D. C. *Vanderbilt News* has announced suspension of publication for an indefinite period, but results of Vanderbilt laboratory work will be distributed in printed or mimeographed form during the interim.

Rubber Trade Association of New York, Inc., on April 8 moved to Room 1121 at 15 William St., New York, N. Y., adjoining the offices of the Distributing Agent for the Rubber Reserve Co. The Association's new telephone number is Hanover 2-9184; while that of the Distributing Agent remains Whitehall 3-1275.

Intercontinental Rubber Co., 745 Fifth Ave., New York, N. Y., in its annual report to stockholders revealed that Mexican guayule rubber production last year totaled 10,121,200 pounds, against 8,325,200 pounds in 1940 and 5,764,400 pounds in 1939. Present rate of production is 12,000,000 pounds, to be raised to 14,000,000 pounds annually, as a result of plant improvements and increased facilities. The company's 1941 Sumatra production was 2,194,017 pounds, contrasted with 1,823,080 in 1940 and 1,378,000 pounds in 1939. The plantation now is in the possession of the Japanese. Its book value is set at $1,288,389.48.

U. S. Rubber Forms New Divisions; Other Company News

United States Rubber Co., Rockefeller Center, New York, N. Y., last month formed a Synthetic Rubber Division headed by John P. Coe, who is also general manager of the firm's Naugatuck Chemical Division. The company this year will begin operations at the huge plant for synthetic rubber production, for which ground was broken last fall; and additional plants also are planned.

The company has formed a department to handle sales of rayon in South and Central American markets. L. C. Boos, head of the Export Division announced. John D. Clarke, director of sales for United States Rubber Export Co., Ltd., will direct activities of the new department, and August W. Kops has been appointed sales manager.

John E. Caskey, assistant general manager of Naugatuck Chemical, has been assigned the additional post of head of the company's Explosive Division.

F. B. Davis, Jr., president and chairman of the board, told stockholders at the annual meeting April 21 in Jersey City, N. J., that war products orders, exclusive of munitions, had exceeded in the first three months of 1942 those for the full year of 1941. Continuing curtailment in the manufacturing of civilian products has, however, accompanied the war materials expansion. Mr. Davis said that the company had been authorized to increase production at the synthetic rubber plant upon which construction was begun last year. A textile factory, purchased to supply hose and belting ducks, and a textile mill that formerly made tire cord are now producing ducks for military uses. Three tire plants are scheduled to make parts for 105 mm. Howitzer guns, airplane wing assemblies, and self-sealing fuel cells; a footwear factory is to make perishable tools for small arms ammunition; and a general products plant will produce battery jars for submarines. The process of conversion has required a large amount of retooling and modernization of many of the company's plants.

Blank & Stoller

John P. Coe

Carl A. Ostling has resigned as production vice president of Carrier Corp., Syracuse, N. Y., to become director of industrial engineering at U. S. Rubber.

S. P. Thacher, manager of the tire engineering and service department at Detroit, Mich., has been granted an indefinite leave by the company in order to act as special assistant to Brig. Gen. J. L. Frink, chief of the Motor Transport Division of the Army Quartermaster Corp. Mr. Thacher will direct an extensive rubber conservation program in the Division.

Hercules Powder Co., Wilmington, Del., at the annual directors' meeting March 25 reelected the following: chairman of the board, Russell H. Dunham; president, Charles A. Higgins; vice presidents, Leavitt N. Bent, Charles A. Bigelow, Petrus W. Meyeringh, Anson B. Nixon, and Gould G. Rheuby; secretary, Raymond N. McAdams; treasurer, Edward B. Morrow.

Hercules was awarded a contract by the War Department for design, construction, equipment, and operation of additional facilities at two manufacturing plants, operation of which will cost more than $5,000,000.

Hohwieler Rubber & Machine Co., Morrisville, Pa., is now operating seven days a week on government work for the ordnance department. The company had been operating below normal for some time.

Martindell Molding Co., Trenton, N. J., operating 24 hours a day six days a week on defense work, has granted an increase of 5¢ an hour to all employes.

Armstrong Cork Co., Lancaster, Pa., in its recent annual statement reported that its peacetime products are in demand for use in many war industries. President H. W. Prentis, Jr., further declared that divisions of the company that normally use raw cork in quantity, as well as rubber, synthetic rubber, and similar items, last year maintained and even improved sales records by developing substitute raw materials and finished articles. About 77% of the company's business could have been carried out without using any cork or rubber whatever.

Endicott Johnson Corp., Binghamton, N. Y., because of a wage dispute is reported to have decided to substitute leather for rubber parts in all shoes. Because of the rubber shortage the company for some time had been considering such action.

Hamilton Rubber Mfg. Co., Trenton, N. J., has contracted for a new brick chimney and other improvements at its plant to cost $6,000.

L. Albert & Son, Trenton, N. J., dealer in rubber machinery, has appointed William McCornish as general manager of the plant at Stoughton, Mass. The concern, which recently purchased the Hygrade Rubber Co. plant at Salem, Mass., had dismantled the factory and installed new equipment.

Raybestos-Manhattan, Inc., Passaic, N. J., at a recent annual stockholders' meeting in New York elected as directors J. H. Matthews and O. H. Cilley. The former is assistant general manager of the Manhattan Rubber Mfg. Division at Passaic; while the latter holds the same position with the United States Asbestos Division, Manheim, Pa.

Joseph Stokes Rubber Co., Trenton, N. J., reports a big increase in business at both the Trenton and Welland, Ont., Canada, plants. The company is handling a large amount of defense work and has contracted for a new oil and gas storage building.

The Thermoid Co., Trenton, N. J., reports that March sales for itself and domestic subsidiaries totaled $1,031,518, against $1,165,563 in February and $932,851 in March, 1941. The company continues to operate to capacity.

Nearpara Rubber Co., Trenton, N. J., has erected a new addition to its plant, 40 by 70 feet, to take care of increased business, and new equipment is being installed. The company reports greatly increased orders for reclaimed rubber.

Krebs Pigment & Color Corp., Wilmington, Del., on April 1 was redesignated the pigments department of E. I. du Pont de Nemours & Co., Inc., of which it has been a part for the past 13 years.

The Fifteenth National Exposition of Power & Mechanical Engineering will be held November 30 to December 5 at the Grand Central Palace, New York, N. Y. Charles F. Roth is manager of the exposition, which will stress means for increasing the production of war materials.

Pittsburgh Plate Glass Co., Pittsburgh, Pa., has elected H. B. Higgins executive vice president. Mr. Higgins, who joined the company in 1905, has been a director and a vice president since 1928 and heads the company's merchandising division.

INDIA RUBBER WORLD extends to *Rubber Age*, 250 W. 57th St., New York, N. Y., heartiest congratulations on its twenty-fifth birthday.

Voorhees Rubber Mfg. Co., Inc., manufacturers of mechanical rubber goods, 151 E. 50th St., New York, N. Y., recently elected the following new officers: president and treasurer, Robert J. Earl; vice president and secretary, Herbert S. May; vice president and factory manager, John J. O'Hare.

NEW ENGLAND

New Recapping Method

A low-cost tire recapping process which does not call for the use of crude rubber has been developed by the Newth Rubber Co., Barrington, R. I., according to President Frank F. Newth. The process, said to have proved practical in all tests to date, will, it is claimed, insure civilian motorists of many thousands of miles of travel. Use of the tire is not expected to be restricted by government regulations because it does not use any crude rubber. The former system of recapping required about seven pounds of camelback a tire, according to Mr. Newth.

An outline of the work and materials used in production have been sent to Chairman Leon Henderson of the Division of Civilian Supply, WPB. With it went an offer by Mr. Newth to visit Washington to explain the process and also to provide a completed tire. Four tires have been forwarded to the Engineers' Division of the War Department for complete testing.

In explaining the process, President Newth said: "Tires with large amounts of tread on them, but with broken casings caused by accidents or running them flat, would be stripped of all rubber. Others with smooth surfaces, even with fabric showing, but possessing solid inner walls would be buffed and cemented. The tread from the tire with broken walls would then be applied to the good shoe and placed in a retread mold and cured in the same manner as a retread."

The finished product, according to Mr. Newth, would be good for between 10,000 and 20,000 miles of wear, depending upon the condition of the tread applied. One tire completed several weeks ago, Mr. Newth said, has traveled 1,500 miles to date and given good performance. The process is unlike that used in making tires of reclaimed rubber. This procedure was abandoned because of the extremely low mileage obtained from the tires, he stated. Mr. Newth pointed out that there are hundreds of thousands of tires in the country which have serviceable treads, but badly broken sidewalls. In the past most of these tires were junked because of the damage they caused to tubes. Hundreds of thousands of others, he declared, with excellent shoes, suitable for recapping with crude rubber before it was banned, are also available.

No patent has been taken out on the process by Mr. Newth, who believes that if it is practical, it should be used nation-wide.

The Sponge Rubber Products Co., Derby, Conn., has announced the retirement of Vice President Lowell D. Smith. His share in the business has been acquired by his partners, President Frederick M. Daley and Secretary-Treasurer Wm. R. Todd.

Farrel-Birmingham Co., Inc., Ansonia, Conn., according to President Nelson W. Pickering, will erect a new plant at Buffalo, N. Y., to cost about $4,000,000.

The Boston Quartermaster Depot recently announced the awarding of contracts for several million pairs of Army shoes, including: service shoes, leather soles, $3.57 to $3.67 a pair; service shoes, rubber taps, $3.435 to $3.53 a pair.

Bristol Mfg. Corp., footwear manufacturer, Bristol, R. I., in fitting ceremonies recently raised a large service flag in honor of employes now with the nation's armed forces. The workers voted several weeks ago to convert all time-and-a-half overtime pay into defense stamps.

The Bristol company, having ceased manufacturing tennis shoes using crude rubber, is working on a process to make such footwear without the use of the restricted material, according to President Maurice C. Smith.

General Insulated Wire Co., Gordon Ave., Providence, R. I., has awarded the contract for a one-story brick addition, of mill construction, 35 by 75 feet.

Rhode Island rubber manufacturers during March employed 4,527 workers, 0.9% less than in February and 2.9% less than in March, 1941. Wages totaled $391,000, 12.1% more than in the previous month and 5.6% more than in March last year. The rubber industry consumed 2,337,000 kilowatt hours of electric power in March, against 2,423,000 in February and 2,634,000 in March, 1941.

New Incorporations

American Hard Rubber Co., consolidation of American Hard Rubber Co. and Pequanoc Rubber Corp. Capital 25,000 shares preferred, 100,000 common. Reynolds, Richards & McCutcheon, 68 Wall St., New York, N. Y.

Arrowhead Rubber Co. of Texas, Dallas, Texas. Capital stock $5,000. A. P. Bagby, R. P. Bennett, and V. Ragsdale.

Climax Rubber Co., Inc., New York, N. Y. Capital 200 common shares, no par value. Crude rubber.

Durant Chemical & Rubber Products, Inc., 673 W. Madison St., Chicago, Ill. Capital 400 common shares, no par value. J. Sears, H. P. Scher, and J. Apida. Chemicals.

Firestone Plantations Co. of Honduras. Capital $50,000. Rubber plantations.

Lord Products Corp., Franklin, Mass. Capital 10,000 common shares, no par value. A. A. Curtis, Wellesley, S. Brown, Brookline, and E. H. Bastable, Newton, all in Mass. Rubber products.

OHIO

Goodyear Activities

Paul W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Co., Akron, has recently announced the following for the permanent operating organization of Goodyear Aircraft Corp.: vice president and general manager, Harry E. Blythe; vice president in charge of manufacturing, Russell DeYoung; vice president in charge of engineering and design, Karl Arnstein; sales manager, T. A. Knowles; comptroller, H. D. Hosken; in charge of Standard Practice and Wingfoot Lake, George Sherry; manager of wheel and brake division, C. H. Zimmerman; executive council, Messrs. Litchfield, Blythe, DeYoung, Arnstein, Hosken, and Knowles, E. J. Thomas, P. E. H. Leroy, J. M. Linforth, and H. L. Hyde.

Other Personnel Changes

Factory Manager W. S. Wolfe has announced the appointment of D. E. Sheahan as production superintendent of tires at Plants 1 and 2, and E. T. Ruffner as superintendent of the spreader division.

C. C. Osmun, merchandising manager of the tire departments, has been made manager of the tire departments, reporting directly to Vice President R. S. Wilson, as will R. D. Mackenroth, general manager of retail stores. Both had formerly reported to Mr. Blythe.

Personnel Director Fred W. Climer also has reported several organization changes. A. G. Michaels, general superintendent of the Goodyear factory at Gadsden, Ala., has been transferred to Aircraft and is succeeded by R. W. Maney, factory personnel manager. Also sent to Aircraft were A. B. Matthews, manager of the Akron labor division, and J. R. Arndt, manager of Goodyear restaurants. Their respective successors are N. R. Cadot, personnel manager of the California factory, and A. C. Humphrey. Named to Mr. Cadot's former post is Tom S. Mick, of salary personnel, who in turn is succeeded by Marshall Gillespie, former night superintendent.

J. J. Blandin, manager of Goodyear's crude rubber department and vice president of its rubber growing subsidiaries in Sumatra, recently completed three decades with the company.

New Developments

Goodyear is testing rubberless automobile tires manufactured in its Akron plant. No disclosure of the substitute material has been made.

Initial output of 26x2.125G-3 All-Weather bicycle tires made from regenerated rubber has been allocated to dealers to assure fair distribution.

Goodyear chemists have developed a heel made entirely of regenerated rubber, said to be fully resilient and longer wearing than other materials now available for heels. As the new heels will be made in black only, shoe manufacturers are bringing out two-tone shoes to meet the situation, tan shoes with black heels.

The company is now making its Multi-V belts with a black cover which is reported to insure longer wear than belts of colored compounds because of the use of black carbon stocks.

Goodyear dealers have been supplied with equipment for electrically branding on both sides of a tire the owner's automobile license number. This plan protects against tire thefts and provides identification of stolen tires.

A fast inflating valve for Goodyear's LifeGuard inner tubes is said to permit inflation or deflation as quickly as with conventional tubes while retaining the safety features of the present grommet-type product which equalizes pressure in the two sections of the tube by a small connecting hole. It is further claimed that the time required for deflating the inner tube in case of a blowout is actually greater than with the grommet-type LifeGuard. The valve has two air ducts, one entering the outer section of the tube and the other the inner section, and equal pressure in both compartments is obtained by circulation of the air back and forth through these ducts which are connected passages with no valve mechanism to hamper the free flow of air.

The Franklin Institute, at its annual Medal Day exercises, April 15, awarded a Certificate of Merit to Goodyear for its "development and successful manufacture of a safety tire which lessens the risk of damage to life and property caused by blowouts." The award was received by Mr. Litchfield.

American Zinc Sales Co., Columbus, O., has appointed as sales engineer M. K. Easley, who joined the company in 1921 to take charge of the rubber laboratory and sales service work to the rubber industry. Since that time he has become closely associated with the plant operations of the American Zinc Oxide Co. and instrumental in the development and control of the processes. In his new capacity he will have the responsibility of coordinating plant operations with sales.

Denman Tire & Rubber Co., Warren, has announced the resignation of President Wilson B. McCandless to enter his country's service. He will, however, retain his interest in the company and remain a director. His successor, as president, is Harry F. Webster, formerly vice president and general manager of the company.

John W. Thomas, chairman of the Firestone Tire & Rubber Co., declared April 18 that the public at the present time should not be over-optimistic concerning rubberless tire developments. He pointed out that the new developments were not yet considered of practical value, and that, if and when, satisfactory rubberless tires are developed some months must elapse before they can be produced in large quantity.

MIDWEST

Detroit Group Sponsors Rubber and Plastics College Course

Wayne University and the Board of Education of Detroit, Mich., have accepted a proposal of the Detroit Rubber & Plastics Group, Inc., to establish at the Detroit college a center for study and research in rubber and plastics. The plan includes formation of a training course for students and a laboratory for investigation in experimental and research problems. The instruction to be offered includes semester courses in properties and testing; compounding and molding; and chemistry of rubber and plastics. Research projects in both fields will be available to graduate students. Arrangements for space for the laboratory in the Department of Chemical Engineering have been made, and it is expected that installation of equipment will be completed by September 1, 1942. Donations of cash, books, periodicals, manufacturers' technical literature, processing, vulcanizing, electrical, stock handling, testing, temperature control, molding, analytical, and special plastics equipment, and stock materials are being sought by the Group committee in charge of the project. To facilitate handling of the project money the Group has recently incorporated under Michigan laws.

Union Asbestos & Rubber Co., Cicero, Ill., according to Secretary John H. Balch, has discontinued the manufacture of brake lining and sold its brake lining stock to the L. J. Miley Co., Chicago, Ill.

Monsanto Chemical Co., St. Louis, Mo., at its regular directors' meeting March 27 reelected all officers and made Osborne Bezanson, general manager of the Texas Division, a vice president of the company.

Thirty-seven rubber firms in the Midwest recently reported paying 18,986 employes $640,000 in wages, a decrease of 4.8% for each figure from the preceding month.

Ford Motor Co., Detroit, Mich., on April 14 announced development of a tire containing ⅛ the amount of rubber usually used. A spokesman for the company said the tire is composed largely of a specially treated fabric. While experiments are still in the preliminary stages, reports of first tests are said to indicate long wearing qualities.

Shell Chemical Co., San Francisco, Calif., according to President J. Oostermeyer, is erecting a large plant for the manufacture of butadiene, to be in production by mid-1943. The new plant, financed by the government under its synthetic rubber program, will cost about $15,000,000.

CANADA

Appointed to War Committees

The Wholesale Administration of the Wartime Prices and Trade Board has created in the various provinces Wholesale Footwear Advisory Committees to study the possibilities of introducing economies in line with those of the Division of Simplified Practice. Among the men named to these committees were J. H. Codner and H. V. Shaw, both of the Miner Rubber Co., Ltd., Granby, P. Q.

Henry Wm. Schultz, of Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., is now director of used tires and rubber goods in the Used Goods Administration.

R. V. Woffindin, general manager, A. G. Spalding & Bros., Brantford, Ont., has been named chairman of an advisory committee to the sports' goods administration of the WPTB.

Lloyd J. Falkenhagen, sales manager, Joseph Stokes Rubber Co., Ltd., Welland, Ont., is on the Plastics Advisory Committee appointed to cooperate with the Controller of Chemicals in regard to all matters concerning synthetic resins, varnishes, molding compositions, and other plastics.

W. H. Male, on loan from Direct Winters Transport, has been appointed deputy to James Stewart, administrator of services for the WPTB. Mr. Male's new responsibilities will, among other things, include directing the program for conservation of rubber, gasoline, and automotive equipment generally.

Fairmont Co., Ltd., government agency controlling the purchase of rubber, has received authority to buy rubber left in the hands of manufacturers who cannot use it, in recognition of the fact that some holders of stocks may be forced out of business because of the restrictions on the use of rubber. The company may also buy sole crepe and sole crepe trimming from footwear manufacturers.

The bicycle industry in Canada will be standardized for the duration. Racing, heavy-duty, and children's models will be eliminated, and manufacture concentrated on the "Victory Model" of standard weight and color; but the total number of bicycles to be produced will be lower than in the past. Because of the rationing of gasoline and tires, the demand for bicycles far exceeds present supply.

Canadian Lawn Tennis Association, through Secretary J. de N. Kennedy, having investigated the quantity of tennis balls which will be available this season in Canada, has learned that the number will be substantially less than in pre-war seasons. Some manufacturers are experimenting with balls made from reclaimed rubber, and a certain amount of success is reported.

Reclaim Use Limited; Other Restrictions on Rubber Goods

The manufacture of hundreds of articles using reclaimed rubber has been halted, and no more such rubber may be processed except by permit or for war supplies. The order reads, in part:

"After midnight, March 23, 1942, no person shall, except under a permit in writing issued by the Controller, start in process any rubber reclaim, ground scrap, crumb, or ground uncured scrap containing fabric, for other than defense projects or for the making of munitions."

Among the many articles affected are hockey pucks, tennis and lacrosse balls, toys, fly swatters, mats, matting, garden hose, soles, and heels. Bicycle tires for new bicycles may be manufactured, but the rubber for this purpose will be limited to the average amount used monthly from June 1, 1940, to May 31, 1941. Bicycle tires for replacement may be made on a quota of 50% of the monthly average for the same period. Under the new regulations processors of rubber, both crude and reclaim, are permitted to make only a few civilian articles regarded as absolutely necessary to the health and industrial life of the country, the list follows:

1. Medical, surgical and laboratory supplies, and druggists' sundries for the feeding of infants and care of sick persons.
2. Protective clothing, gloves, and footwear for such essential services as police, firefighting, commercial fishing, mining, lumbering, merchant marine, decontamination, and where necessary for workers in the dairy, canning, acid, and electrical industries.
3. Articles for industrial machinery, hard rubber and sponge rubber products and compound latex for industrial equipment and for the repair of industrial plants and mines, fire departments, transportation companies and other public utilities.
4. Component parts, not otherwise specified, made wholly or partly of rubber for incorporation in articles of various kinds, if the Controller has first stated in writing that rubber is necessary in their manufacture.
5. Rubber compounds for the making of wire and cable.
6. Suction and gasoline hose.
7. Essential plumbers' supplies.
8. Tires and tubes of seven inches or more in cross-section for other than private passenger cars. (No passenger-car tires are being made.)
9. Tire repair materials, other than tire repair kits.
10. Camelback for retreading.
11. Automotive parts if the Controller has first stated in writing that the use of rubber is necessary in their manufacture.
12. Rubber cement for the shoe trade.
13. Staple black lines of waterproof footwear.
14. Jar rings and sealing compounds for canning foods other than beverages.

Amplification of previous restrictions on the use of elastic was made in a ruling prohibiting the use of elastic thread for shirring in dresses and calling for a 50% reduction in the use of elastic in women's and children's hats and overalls, trousers, and windbreakers. Among items in which full elastic waists must be limited are bloomers, panties, pajamas, shorts, drawers, boys' jersey suits, dresses, and bathing suits. All other items of wearing apparel, knitted or woven, are lumped together under the order.

Restrictions in the styling of men's, youths', and boys' waterproof and rubberized coats have been ordered by the Chairman of the Wartime Prices and Trade Board, Ottawa, Ont. The restrictions apply to goods manufactured on or after May 1, and apply to goods wholly or partly manufactured in any Canadian establishment of any nature where any waterproof or rubberized clothing is made for sale. The order is issued with the concurrence of the Administrator of Retail Trade.

An order, dated April 9, from the WPTB to retailers prohibits merchants from displaying in their store windows or advertising in any way any rubber product ordinarily used by civilians, including erasers, bath toys, capes, bathing caps and suits, footwear, shoes with rubber soles, gloves, druggists' sundries, pump and garden hose, fly swatters, babies' wear, stationery articles, and balls of all kinds including bladders for footballs, basketballs, and punching balls. Mail-order catalogs may continue to list these products, but no catalog issued on or after July 15, 1942, is permitted to carry illustrations of any goods mentioned in the order.

The Dominion Department of Munitions and Supply, Ottawa, Ont., has announced that J. R. Nicholson, Vancouver, B. C., Deputy Controller of Supplies, has been made manager of Polymer Corp., Ltd., Toronto, Ont., recently organized to carry out the government's synthetic rubber manufacturing program. On December 26 Mr. Nicholson was appointed chairman of the Rubber Substitutes Advisory Committee and on February 5 was given the same post with the Synthetic Rubber Technical Advisory Committee. During recent weeks Mr. Nicholson cooperated with A. L. Bishop, president of the Polymer company, in organizing it and also in negotiations with the Rubber Reserve Co., Washington, D. C.

The Department recently purchased 50,000 pairs of rubbers and overshoes to outfit the Canadian Women's Auxiliary Air Force and the Canadian Women's Army Corps.

Steel Controller Kilbourn last month notified automobile wrecking companies that wrecked cars on hand must be sold within 90 days; then the Department of Munitions and Supply will take over the remaining stock, leaving dealers such parts as may be deemed reasonable. The object of this order is to acquire large quantities of scrap steel, and it is expected that many tires will also thus become available. Those that are too far worn will be added to the scrap rubber pile.

Canadian General Rubber Co., Ltd., Galt, Ont., according to E. Willis, purchasing agent, is working on a rubber synthetic and has achieved some success.

Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., is advertising in daily newspapers on "How to Conserve Rubber Products." Many rubber goods in civilian and industrial use are illustrated, and consumers are advised to consult the Dunlop Field Engineering Service for major industrial repairs.

Cecil Lamont, of Winnipeg, Man., upon his return from the recent Eighth Annual Chemurgic Conference at Chicago, Ill., where the possibility was favorably discussed, forecast cultivation in western Canada of *kok-sagyz* on a commercial scale as a source of natural rubber. The Northwest Line Elevators Association is trying to obtain seed for experimental planting, and its agricultural department will plant test plots as soon as seeds are available. Results will be made public. Mr. Lamont went to Ottawa to ascertain if the Dominion Government can arrange to have seeds released by the Soviet Union and flown to Canada in time for planting this year.

The B. F. Goodrich Co. of Canada, Ltd., Kitchener, Ont., according to President G. W. Sawin, has retired on pension P. Y. Smiley, manager of footwear designs. He has been with the company since 1925 when Goodrich purchased the Ames Holden Tire Co., Kitchener, and started manufacturing rubber tires and footwear in Canada. A large dinner party was given Mr. Smiley by his associates, who also presented him with a complete outfit of fishing tackle.

Vincent P. Reid, general manager, General Tire & Rubber Co. of Canada, Ltd., Toronto, Ont., was elected president of the Sales Research Club, Toronto, at its annual meeting in April.

Frank W. Dowsett, advertising manager, of Gutta Percha & Rubber, Ltd., Toronto, Ont., recently returned from a trip through Western Canada during which he visited the company's branches and delivered 27 addresses before groups representing 35 organizations.

FROM OUR COLUMNS

50 Years Ago—May, 1892

The Department [United States Department of Agriculture] is making no attempt at the introduction of the rubber plant in Florida, nor is one contemplated, because the rubber tree is a strictly tropical plant, and while it might live on some of the Keys of Florida, it would not likely, in the opinion of our Horticulturist, yield a commercial product in any portion of that state. (p. 232)

25 Years Ago—May, 1917

Chemical Patents. The Dominion of Canada. Rubber Substitute. Fish oil, sulphur, five to one, and a metallic oxide, combined by heating from 175 to 220° C., and subsequent heating of mass under relatively high pressure at 155° C. (Canadian patent No. 173,601.) (p. 453)

Bicycles have become almost extinct in Germany since the seizure of rubber tires. Corks from wine bottles provide a substitute, about 100 being needed for both wheels. The corks should be of equal breadth, not tapering sharply, four to five centimeters long and about 23 thick. They are pressed tightly together and cemented to the rims of the wheels. Cork is very elastic, and although it has not the resilience of rubber, especially on rough pavements, when traveling on good roads it is quite satisfactory. (p. 480)

Japanese planting interests [Malaya] have grown until now the invested capital aggregates $7,000,000. Of the leased area, amounting to 110,000 acres, 50,000 acres are now planted and the 1916 production of rubber reached 2,230,000 pounds. The planted area is constantly increasing, and will soon become 60,000 to 70,000 acres. (p. 481)

Investigations to discover the causes of abnormal leaf fall from *Hevea* trees have been made at the experiment station at Malang [Malaya], but with no very definite results. In most cases heavy rains prevailed just before such leaf fall occurred. In some instances parasitic fungi have been found on the leaves. Dr. Arens advises that fallen leaves should be gathered and burned on the spot. If possible the affected trees and those nearby should be treated with fungicide. Trees thus treated should not be tapped, as they might produce tacky rubber because of the use of the fungicide. (p. 482)

In one experiment [British Guiana] 300 trees tapped by a man and a boy, yielded 873 pounds of dry rubber, which cost $58.40 to collect, or less than 7¢ per pound. Most of the produce was sold in London in February, 1916, at a price of 81¢ per pound for biscuits and 68¢ per pound for scrap and other lower grades. (p. 483)

FINANCIAL

American Cyanamid Co., New York, N. Y. For 1941: net income after preferred dividend requirements, $6,766,292, equal to $2.42 a common share, against $6,395,666, or $2.44 a share in 1940; taxes, $13,993,915, against $4,741,571.

American Hard Rubber Co., New York, N. Y. For 1941: net profit, $495,087, equal after dividends on 8% preferred, to $5.50 each on 65,503 common shares, against $456,457, of $4.73 a common share, in 1940.

American Wringer Co., Woonsocket, R. I., and consolidated subsidiaries. For 1941: net profit, $380,512, against $261,225 in 1940; net sales, $5,108,547, against $3,811,680; income and excess profits taxes, $243,121, against $261,225.

American Zinc, Lead & Smelting Co., Columbus, O. For 1941: net income, $695,319, equal after preferred dividend requirements, to 52¢ each on 673,100 common shares, against $596,305, 38¢ each on 673,088 common shares, in 1940.

Anaconda Wire & Cable Co., New York, N. Y. For 1941: net profit, $2,507,476, equal to $5.94 each on 421,981 shares, against $1,717,468, or $4.07 a share, in 1940; income and excess profits taxes, $6,200,000, against $950,000.

Armstrong Cork Co., Lancaster, Pa. For 1941: net profit, $4,241,258, equal to $2.86 a common share, against $4,154,066, or $2.79 a share, in 1940; sales, a new high, $78,619,683, against $57,353,703; taxes, $5,078,471, against $2,430,839.

Barber Asphalt Corp., Barber, N. J., and subsidiaries. For 1941: net profit, $257,679, against net loss of $188,796 in 1940; total volume of business transacted, $13,289,736, against $11,120,873.

Belden Mfg. Co., Chicago, Ill. For 1941: net profit, $641,405, against $373,127 in 1940; net billing, $10,044,422, against $6,254,659; taxes, $1,103,264, against $281,070; net billing, net profit, and total payroll were each the highest in the company's 44 years.

Brunswick-Balke-Collender Co., Chicago, Ill. For 1941: net profit, $2,036,887, equal, after preferred dividend requirements, to $4.28 each on 444,655 common shares, against $2,383,497, or $5.05 a common share in 1940; net sales, $20,796,823, against $16,901,234.

Canadian General Electric Co., Ltd., Toronto, Ont. For 1941: net income, $2,479,556, equal, after preferred dividend requirements, to $12.60 a common share, against $2,308,019, or $11.71, a share in 1940.

Columbian Carbon Co., 41 E. 42nd St., New York, N. Y. For 1941: net profit, $3,529,159, equal to $6.57 each on 537,406 common shares, against $3,068,799, or $5.71 a share, in 1940; sales, $21,121,296, a record high, against $16,140,525; taxes, $3,140,263, against $1,816,044.

Crown Cork & Seal Co., Baltimore, Md., and wholly-owned domestic subsidiaries. For 1941: net profit, $2,929,861, equal, after preferred dividend requirements, to $4.68 each on 517,614 common shares, exclusive of those in the treasury, compared with $2,525,969, or $3.90 a share, in 1940.

Crown Cork International Corp., Jersey City, N. J., and wholly-owned domestic subsidiary. For 1941: net income, $383,422, against $181,413 in 1940; taxes, $57,892; provision for contingencies and post-war adjustments, $250,000.

(*Continued on page* 194)

Break Through Public Ignorance

Again and again, surveys show how ignorant the public is of what industry is doing. Not of what industry is making. Not of industry's efficiency. But of what industry represents . . . of the fact that it is the industrial genius of the country, which by processing our materials, is the only real creator of the advantages which Americans enjoy.

A man who can bat the ball over the wall is known to everybody. The rubber technologist who produces a better accelerator is known only to his associates. But worse, the real part that rubber plays in every man's life is utterly unrealized.

Industry must break through this public ignorance. First, for its own security, its very existence. Secondly, because understanding and confidence in industry is the essential foundation on which we must build when the war is won.

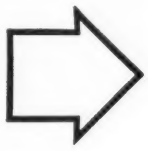
The post-war depression is optional. If people feel it is inevitable, there can be a depression. But *why* let them feel that way?

In its pages and elsewhere, The New York Times will tell the story of what industry means to America today and what it can mean to every man and woman tomorrow. Two advertisements about the rubber industry are reproduced on following pages.

But in its full details, that story *must* be told by the industry itself—and told *immediately*. And we urge advertisers to consider The New York Times as the first choice among the media they will employ to tell it. Not only because of the tremendous importance of the New York market as a financial and production center, or as America's Number One market, but also because in more than 10,000 cities and towns throughout the entire country, The New York Times is read and trusted by the editors, clergymen, lawyers, merchants, buyers, club women, the *articulate* people of each community. They are the greatest leadership group you can reach with advertising.

The New York Times

"ALL THE NEWS THAT'S FIT TO PRINT"



Hitler will learn . . . but so should we!

We've got to have millions of rubber tires for jeeps and peeps, for tanks and planes . . . right away!

Call Akron!

We've got to have thousands of miles of rubber transmission and conveyor belts for new war plants . . . immediately!

Call Akron!

We must equip every plane with rubber tanks for their gasoline and oil . . . it's life or death!

Call Akron!

We've got to have rubber to absorb shocks, rubber to resist air, rubber to control electricity . . .

We've got to have rubber to cushion movement, rubber to develop speed . . .

We've got to have rubber! Call Akron!

Call Akron and tell them that the East Indies are gone . . . but we've got to have rubber!

Well, we're going to get rubber. Because for 20 years, the rubber industry in Akron and everywhere else has been getting ready.

Not ready for war, no! Ready to serve you and your peacetime needs . . . to make available the thousands of better things you could have if there were *more* rubber.

True, only a few of the new plants have been built.

And building more will take many months! Getting by until they're ready is going to be tough! But when they are . . .

Hitler and the others are going to find out what production really means!

But so should we! The story of the rubber industry finding its real stature under the pressure of our bitter need would be inspiring to every American. The "know-how," acquired through never-ceasing research, which is going to enable us to create a new industry out of chaos, is inspiring. The things that this new industry will turn out for you in addition to tires when peace is won, are inspiring.

Why not tell that story in The New York Times? Its readers in the all-important New York market and in 10,000 towns and cities throughout the country are the *articulate* people of the nation. Lawyers, editors, doctors, merchants, buyers, manufacturers, they form opinions, they create confidence, they inspire action all about them.

American industry should use this force to tell our people this:

With the birth of our country was born the real age of business and commerce. It was no mere mercenary age, but an era of unprecedented and undreamed-of advantages.

Let us consider this war as a disruption in our work of raising the world's standard of living, of constantly increasing the well-being of man.

And let us always remember that the sooner this disruption is over, the sooner the war is over, the sooner we can *all* get back to work.

So, *let's buckle down and get the job done.*

The New York Times

"ALL THE NEWS THAT'S FIT TO PRINT"

This advertisement appeared as a full page in the New York Times, Sunday, April 19th.

Reprints on request.

Why aren't people told?

Enduring heat and cold and storm! Holding out against fatigue and despair and pain! Crawling forward just one more yard in the face of the enemy! Drawing just one more breath in the face of death!

The doughboys, the gobs, the leathernecks are waiting.

Waiting for the might of America to be diverted to waging war.

Waiting for the tanks and planes and trucks. Waiting for rubber!

Because this time, victory is not just to the brave.

Victory is to the speedy.

And you can't have speed without rubber. Shoe a tank with rubber instead of metal for instance, and it goes ten times as far, ten times as fast, ten times as easily.

. . . and we've lost 97% of our rubber supply.

But already, plants are rising up over the face of America to *create* rubber out of oil, out of coke and limestone and salt; almost, you might say, out of thin air.

Somehow, American industry is going to get the rubber that victory is waiting for.

And take still further pride and comfort from this thought! As each new war plant rises up, a vaster foundation is being laid for a *richer* America tomorrow.

When the war is won, these countless new rubber plants won't be abandoned. From them will come stockings that don't run, clothing that wears indefinitely, roofing that can't give out, auto bodies that won't crumple—thousands of things we couldn't have before, because there wasn't enough rubber.

A new rubber industry is being created out of nothing by American genius! Why, Akron itself will need a population of 1,000,000 for processing alone, say the manufacturers! And it will take millions more men throughout the country to produce needed raw materials!

Millions of jobs!

New jobs, most of them . . .

Why isn't the country told?

Next to mechanized war, unemployment is the most tragic thing in our civilization. And haunting every soldier, every war worker is the knowledge that some day he must find a new job.

Why not help to remove *that* shadow, at least? Why not tell him about the new cotton that will have to be grown, the new acres of natural rubber that will have to be planted, the new rayon that will have to be made, the additional oil and sulphur and zinc and titanium our rubber factories will need? . . .

This spring, again, the flowers in America's gardens remind us that life can be, if not ideal, then, at least, beautiful.

Just so the factories rising through the land tell us that, when the war is won, life can be if not perfect, then at least, generous.

So, let's get it won!

The New York Times

"ALL THE NEWS THAT'S FIT TO PRINT"

TO TELL AMERICA BEGIN WITH THE TIMES

The New York Times is a *national* influence. It reaches people who think. It reaches people who do. It reaches people who make those about them think and do. Surveys show that in the huge New York market and in 10,000 communities throughout the country, The Times is read regularly by:

58% of college and university officers and superintendents of schools
37% of members of the National Association of Manufacturers
71% of the editors of leading daily newspapers
36% of the editors of leading weekly newspapers
51% of the editors of leading trade and technical magazines
59% of public officials (members of Congress, mayors and city managers)
44% of leading lawyers and physicians
50% of the senior executives of firms listed on New York Stock Exchange

These are the *articulate*, influential people of America. That is why readers of The New York Times are the greatest leadership forces reached by advertising.

This advertisement appeared as a full page in the New York Times, Sunday, May 3rd.

Reprints on request.

CLEAN LEAD—

Invariably—for Making Better Sheath

when using the

Robertson CLOSED LEAD MELTING POT

Exclusive and specific design and construction features assure uniformly clean lead.

All Robertson Equipment—engineered in entirety by the one manufacturer—is similarly built for the utmost in service and economy.

Write for reasons why the Robertson Closed Lead Melting Pot is so extensively used.

John Robertson Co. Inc.

131 WATER STREET, BROOKLYN, N. Y.

Designers and Builders of

All types of lead encasing machinery for rubber hose and electrical cable manufacturers, including Extrusion Presses, Hydraulic Pumps, Melting Furnaces and Pots, Dies and Cores, Hydro-pneumatic Accumulators and Lead Sheath Stripping Machines.

LATIN AMERICA

HAITI

Abel Lacroix, of the Department of Agriculture and of Labor, Port-au-Prince, has stated that from 12 to 15 long tons of wild rubber, *Hevea* and *Castilloa*, now in full production on the plantations of the Société Haitiano-Américaine de Développement Agricole, can be collected annually at a cost of about 25¢ to 30¢ a pound. Much labor is available, with daily wages ranging from 25¢ to $1 for experienced workers. No additional capital is necessary for the aforementioned tonnage. The question of transportation facilities from producing areas to shipping points is easily solved by motor.

Société Haitiano-Américaine also has more than 2,000,000 *Hevea* plants in its nurseries and hopes to commence production on 5,000 acres in 1946, after which 10,000 acres will enter into production each year during the four or five years following.

ECUADOR

Prospects for the Ecuadoran rubber industry in 1942 are exceedingly bright, reports to the United States Department of Commerce indicate. During 1941 there was not an excessive demand for Ecuadoran rubber owing to the fact that it is not of a very high grade, and importers claim it contains a considerable percentage of extraneous matter. However, with supplies of rubber from the Netherlands Indies and Straits Settlements cut off, production of rubber in Ecuador has assumed greater importance. There is a very active demand, and sales are expected to be limited only by the quantities available. By the end of January, 1942, rubber exporters in Ecuador were receiving 30¢ per pound for a rather poor grade, and were confidently predicting a further rise within a few months to 75¢ per pound.

COLOMBIA

A United States rubber firm and Colombian automobile interests are reported to be studying the possibilities of establishing a tire factory at Cali for which Colombian-grown rubber would be utilized. Local industries, it may be mentioned, use a certain amount of an inferior native black rubber obtained from Temaco, Narino.

BRAZIL

Brazil is attempting to increase its business with Mexico, and an economic mission sent to that country recently reported on Mexican needs that Brazil could supply. Among these is, of course, crude rubber, but Mexico has been buying small amounts of certain rubber goods from Brazil. In 1940, 239 kilos, chiefly rubber stationers' supplies, were purchased, and in the first ten months of 1941, the amount increased to 274 kilos.

Press reports indicate that a decree signed by President Vargas on April 1 gives the Bank of Brazil control of the entire rubber trade. All rubber dealings must be made through the bank, which now is the only buyer and seller of rubber. Besides the bank is authorized to finance the manufacture of Brazilian rubber products.

GUATEMALA

Guatemala and El Salvador recently arranged a treaty of free trade covering most articles of commerce between the two countries. An example of the interchange of trade is supplied by the exports of rubber-soled canvas footwear from Guatemala to El Salvador. These shoes are manufactured in Guatemala and have soles made of Guatemalan-grown rubber; while the tops are of canvas produced in El Salvador.

EUROPE

GREAT BRITAIN

Criticisms on the Rubber Situation

Since the Japanese began their successful grab of the Far Eastern rubber centers, various persons in and out of the rubber industry have been trying to apportion the blame for the situation as far as the supply of rubber is concerned, and some particularly acidulous attacks on the various branches of the rubber industry have occurred in the House of Commons. There seems to be a wholly unwarranted feeling that rubber planters are somehow responsible for the turn of events in the East; on the other hand, opposition of vested interests and negligence on the part of rubber manufacturers are blamed for the fact that England has no synthetic rubber industry to speak of and that only a limited amount of reclaim is produced. The government's reclaim policy, whereby old rubber for reclaiming purposes is to be sent to America in return for which England is to receive large quantities of synthetic rubber, is criticized as unwise in view of the danger from U-boats and the general lack of shipping facilities.

Furthermore dependency on the United States for synthetic rubber is decried. As one writer put it, England has abundant supplies of coal and lime from which synthetic rubber of the Buna type could be produced, and there is no reason

FOR EVERY RUBBER PLANT

With today's changes in stock, chemicals and men it is more essential than ever to use a dependable instrument to check temperatures in the making and curing of rubber. It helps to maintain maximum production and to avoid scorching. You will find that the routine use of the Cambridge Pyrometer in your plant will improve your product and reduce spoilage. It is convenient to use . . . so the men do use it.

CAMBRIDGE INSTRUMENT CO., INC.
1732 GRAND CENTRAL TERMINAL, NEW YORK, N. Y.

The surface model is for checking temperatures of still and moving rolls, the needle type for within the mass, the mold for reaching into cavities. Send for particulars.

CAMBRIDGE
SURFACE • NEEDLE • MOLD
PYROMETERS

NAFTOLEN* R100

the *true*

EXTENDER

for

CRUDE RUBBER,

RECLAIM

and

SYNTHETICS

W
-C=C-

Wilmington Chemical Corporation

10 East 40th Street, New York, N. Y.

Plant and Laboratory: Wilmington, Delaware

*Reg. U. S. Patent Office

REPLACE FATTY ACIDS

WITH
PARA LUBE + SL-20
(EQUAL PARTS)

YOU GET A BETTER LOOKING PRODUCT AND MORE CURES PER MOLD CLEANING

Equal parts of Para Lube and SL-20 is a C. P. Hall development that does the job of fatty acids ***better*** and ***more economically.***

Such a significant improvement in the manufacture of molded rubber products surely deserves your attention.

The C. P. Hall Company invites you to test this formula in your own plant or laboratory. See how PARA LUBE + SL-20 cuts costs . . . insures cleaner and quicker knockout . . . gives maximum number of cures per mold cleaning!

The C. P. Hall Co.
CHEMICAL MANUFACTURERS
AKRON • BOSTON • LOS ANGELES • CHICAGO

why a new industry of vital importance to England should be placed abroad especially as the enormous development of synthetic rubber in other countries has in any case sounded the doom of the rubber plantations.

Chemical Derivatives of Rubber

Various of the less well-known derivatives of rubber were included in a paper reviewing "Chemical Derivatives of Rubber", by F. A. Jones.[1] He mentioned a fluorine derivative containing up to 30% of F and useful in electrolytic cells for the production of fluorine, when it forms a fluid-tightening and electrically insulating medium. Then there are various products with thermoplastic properties obtained by treating rubber with (1) peracetic acid (these products can serve as substitutes for celluloid, gutta percha, or shellac); (2) hydrofluoric acid (yielding leather-like or horny materials); or (3) by combining with aromatic amines. Regarding the latter, it is stated that the aniline compound, for instance, can be used as a molding powder or as an adhesive for bonding rubber to steel.

An unlimited number of azo rubber dyes, greatly varying in color and properties, are obtainable when diazotized diamine diphenyl hydro rubber is coupled with phenols and amines. Products having resistance to oils and solvents almost equal to that of the best synthetic rubber-like materials are obtained by using 15 to 25% of thiocyanogen in benzene solution.

A process, patented by the Dunlop company, subjects vulcanized rubber to the action of boron trifluoride and paraformaldehyde in acetic acid, by which a surface coating of the derivative is obtained rendering rubber less easily deformable and more resistant to surface abrasion.

[1] *Trans. Inst. Rubber Ind.*, XVII, 133 (1941).

I.R.I. Notes

At the meeting of the London Section of the Institution of the Rubber Industry, February 9, F. D. Ascoli presided over a symposium on latex technology. The following papers were read: "Electrodecantation", by E. A. Murphy; Acid Constituents of Preserved Latex: "Importance in Zinc Oxide Compounding", by W. G. Wren, and "Determination, Distribution, Variation", H. C. Baker; and "Some Peculiarities of Latex Gels", L. R. Ridgway.

Other meetings of the London Section were planned for March 9, when the program included a paper on "X-Ray Analysis as Applied to Rubber and Similar Long-Chain Compounds", by G. A. Jeffrey. Finally, the London Section's annual meeting was set for April 13, to be followed by a paper on "Engineering Problems of the Rubber Industry", by C. D. Lightfoot.

At the meeting of the Leicester Section, February 11, a paper on "The History and Development of the Pneumatic Tire" was read by Colin Macbeth.

IRELAND

The shortage of crude rubber in Ireland is acute and will become worse since no further supplies can be expected from England. Accordingly the Irish Government has stopped the sale of practically all rubber goods and will prohibit the manufacture of all except essential articles so that production of rubber boots, soles, heels, hot water bottles, golf and tennis balls, and various other goods will cease, for the time being at least.

The Dunlop branch in Ireland has hitherto been allowed to use part of its crude rubber to manufacture goods for local distribution, but this will no longer be possible, since the entire output of the Irish Dunlop factory will be needed in England.

The government has also temporarily suspended, from February 10 to August 9, 1942, import quota restrictions on pneumatic tires, tubes for motor vehicles and cycles, canvas and

rubber shoes, soles, heels, boots, shoes, except certain rubber heeled shoes.

SWEDEN

Because it is impossible to obtain any crude rubber whatever, three Swedish concerns, Swedish General Electric Co., Swedish Sugar Phosphate Co., and the Mo & Domajo Pulp Co., are said to be collaborating on experiments to produce synthetic rubber from carbide. The rubber produced by this process, said to be similar to one used in America, will be suitable for insulation and oil-resistant purposes, but not for tires. The government has been asked for an appropriation which the concerns would match with an equal sum.

SPAIN

The Spanish Government has issued an order setting forth certain provisions for the best utilization of their small stocks of crude rubber as well as scrap rubber, according to the United States Department of Commerce. Possession of either crude or scrap rubber is illegal unless authorized by the Ministry of Industry and Commerce. Holders of these commodities must report under oath the extent of such stocks, including rubber salvaged from shipwrecks. The making of rubber tires for cars and trucks will be discontinued, causing factories to cancel previous tire allocations that have not been delivered.

PORTUGAL

According to a Brazilian source, Portugal intends to remedy the local shortage of tires for automobiles by manufacturing these goods herself from rubber obtained from Portuguese colonies. It seems that in the vicinity of Espinho a factory is being rapidly erected to be equipped with American machinery and to employ about 500 persons. The management is to be exclusively Portuguese. Hitherto Portugal has been entirely dependent on imports for her tires.

While it is hardly likely that American machinery would be shipped to Europe under present conditions, it is possible that this reference is to the resumption of an undertaking planned to start two years ago, which perhaps had to be temporarily shelved.

TURKEY

Reports from Turkey state that during the first half of 1941 local tire stocks were completely inadequate despite decreased consumption following government control of the operation of private cars and taxis. Nevertheless available statistics show that tire imports increased over 50% in the first five months of 1941 as compared with the same period of 1940, 418,986 kilos, against 275,145 kilos. In the 1940 period the United States and England (in the order named) together supplied about two-thirds of the total amount of tires; the remaining third came from France, Germany, Italy, and Czechoslovakia. The last four countries were eliminated as sources of supply in 1941, and England became the chief shipper, increasing her business by more than 125%, followed by the United States and Netherlands.

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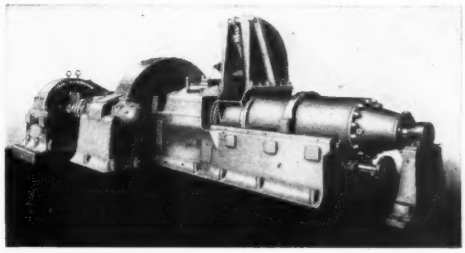

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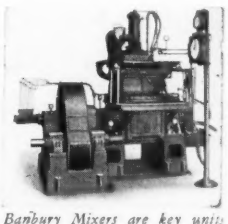

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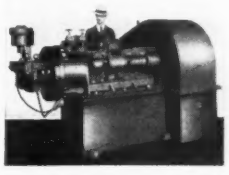

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MALAYA

Following halogenation experiments by H. C. Baker in 1938 on ammoniated latex, attempts were made at the Rubber Research Institute of Malaya to repeat the tests on fresh latex, when sodium chlorate and hydrochloric acid reagents were replaced by aqua regia (mixture of nitric and hydrochloric acids). In a communication of the Institute, V. H. Wentworth describes the method finally developed after many unsuccessful trials with different stabilizers and combinations of mixed acids, by which a fine, free-flowing yellowish-brown powder was obtained.

This powder was more than double the weight of the original rubber in the latex. Final analyses were not made; so the exact composition of the powder is not known, but the estimates for chlorine in the Parr bomb showed 26.1% and of nitrogen by Kjeldahl, 5.3%. The powder is insoluble in water and sodium carbonate solution, but soluble in caustic soda solution, changing to a dark brown on contact with the alkali. It is insoluble in dilute sulphuric acid, but dissolves in the cold concentrated acid without decomposition. In aqueous ammonia it is only partially soluble, and when filtered, the residue on the filter paper dissolves in acetone, but gives a much darker solution than the original powder. It does not decolorize bromine in carbon tetrachloride solution. The product softens when warmed to 80° C. and can then be pulled out into brittle threads, but at 130° C. thermal decomposition sets in with rapid generation of heat and carbonization of the mass.

As to the effect of organic solvents: it is soluble in acetone, ethyl acetate, ethyl lactate, butyl phthalate, ethylene glycol monoethylether, triacetin, and cyclohexanone; a small insoluble portion is left in amyl acetate, isobutyl acetate, n-butyl acetate, and tricresyl phosphate; it is only partially or slightly soluble in cyclohexanol, ethyl alcohol, amyl acetate, and chloroform; finally it is insoluble in ether, petroleum ether, benzene, toluene, xylene, cyclohexane, dekalin, tetralin, carbon tetrachloride, trichlorethylene, tetrachlorethane, monochlorbenzene, and carbon disulphide.

It is thought that the product may have numerous technical possibilities worth investigating.

AUSTRALIA

Prior to the outbreak of hostilities, Australia imported wires and cables to a value of approximately £1,150,000 annually, according to reports from that country. Under existing conditions, however, it has become increasingly difficult to obtain these goods from English manufacturers, and Australia finds itself forced to attempt to supply its own needs.

The Olympic Tire & Rubber Co., the first to tackle the problem, formed a special cable division which, it is said, was able to furnish cable to a value of about £250,000 up to July, 1941. Latest reports indicate that productive capacity of this company has been increased considerably since then.

It is also learned that a second cable factory is to be opened in Liverpool, New South Wales, by Cable Makers Proprietary, Ltd., but this is not expected to have so large an output as the Olympic concern.

The decision of the local government to pay bounties aggregating up to £25,000 on all rubber-insulated wire and cable other than that supplied for defense purposes will no doubt help further to stimulate production.

Reminder—Are you doing your bit toward the Victory Program? Buy United States War Savings Stamps and Bonds *Today*.

Editor's Book Table

BOOK REVIEWS

"Chemical Engineers' Handbook." Second Edition. John H. Perry, Editor. McGraw-Hill Book Co., Inc., 530 W. 42nd St., New York, N. Y. 1941. Fabrikoid, 3029 pages, 5 by 7¼ inches. Thumb indexed. Price $10.

Most sections of this edition have been either thoroughly revised or rewritten to encompass recent developments in the theory and practice of chemical engineering. New chapters and tables have been added, and the more important sections enlarged to insure a comprehensive coverage of all chemical engineering operations, their tools and equipment. The chapter "Materials of Construction" includes a table of the physical properties of rubber and rubber-like substances and a list of representative manufacturers of industrial rubber products and rubber-like materials. Rubber belting, electrodeposition of rubber, rubber and rubber-lined pipe, rubber fabric, and the operating characteristics of rolls grinding hard rubber are also discussed. An extensive new index has been added.

"The Condensed Chemical Dictionary." Compiled and edited by the editorial staff of the "Chemical Engineering Catalog", Francis M. Turner, Editorial Director. Third edition, revised and enlarged under the supervision of Thomas C. Gregory, Editor. Published by the Reinhold Publishing Corp., 330 W. 42nd St., New York, N. Y. Cloth, 6 by 9 inches, 756 pages. Thumb indexed. Price $12.

The alphabetical classification and general arrangement of this reference book of essential chemical data is the same as that of the second edition. The synonyms, chemical formulas, colors, properties, constants, specific gravities, melting and boiling points, solubilities, methods of manufacture and raw materials from which they are made, grades, uses, fire hazards, shipping regulations and containers of approximately 18,000 chemicals are included. About 6,000 new items were added to the 12,000 contained in the second edition which have been thoroughly brought up to date. A large number of chemical specialties sold under brand names are given, as are many defense and substitute products. A new feature is a survey of the effects of war on chemical prices.

Rubber is discussed under "Caoutchouc" and the information on latex is from the "Chemistry and Technology of Rubber" edited by C. C. Davis and J. T. Blake. Synthetic rubber is described generally under the term "Lastics", and more detailed information on the properties and uses of 14 commercially produced American and European synthetic rubbers and rubber-like materials is given under the trade names of the products. Several errors concerning rubber in the second edition have been corrected, but balata is again incorrectly listed as a source of chicle, and the guayule shrub, of pontianak gum.

"How to Prepare a Foreman's Policy Manual." R. C. Obendahn. Published by the National Foremen's Institute, Inc., Deep River, Conn. 1942. Fabrikoid three-ring loose-leaf binder, 7 by 10 inches. Indexed. Price $6.50.

This manual of procedures is actually a replica of a book of rules and instructions for plant and factory foremen. The first section contains basic material relating to a foreman's duties and responsibilities. The second section is a simplified summary of legislation affecting workers. The third section, "Company Policies", is a selected compilation of the rules, practices, and procedures of various outstanding companies, alphabetically grouped by subject. It may be used as a guide in formulating and preparing, for the use of foremen, policies and regulations adapted to specific company needs. Such material can be inserted under the proper index tabs in the binder supplied by the publishing company of the Manual. The author believes that such a policy manual outlining clearly defined rules and how and when a foreman is to interpret them will result in improved employe attitudes.

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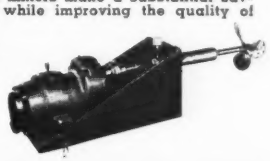

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"Du Pont, One Hundred and Forty Years." William S. Dutton. Published by Charles Scribner's Sons, 597 Fifth Ave., New York, N. Y. 1942. Cloth, 9¼ by 6¼ inches, 396 pages. Indexed. Price $3.

Romance, tragedy, bravery, and humor fill the pages of this exciting, but never sensational biography of a business and the men who fostered its growth from the year 1802 when Eleuthère Irénée du Pont de Nemours established a small gunpowder factory near Wilmington, Del. A number of du Pont associates helped to collect the material from which the author has skillfully woven an account of the ingenuity and ability of many men who contributed in divers ways to the development of a long list of products important in war and peace. Following the detailed story of the company's expansion in the production of explosives, Mr. Dutton describes the diversification of interests in the field of synthetic organic chemicals. The resultant discoveries in du Pont laboratories included new dyestuffs, rayon, cellophane, nylon, plastics, synthetic ammonia, industrial alcohol, photographic film, pharmaceuticals, seed disinfectants, lacquers, more than 100 rubber compounding ingredients, neoprene, and other things.

A chapter is devoted to neoprene. Following the methods of German synthesis of acetylene during the World War, du Pont chemists in 1925 began experiments aimed at the production of chemically made rubber. The cooperation of Father Nieuwland, of Notre Dame University, that aided in the isolation and quantity production of mono-vinyl-acetylene and the further research steps that successfully resulted in "chloroprene rubber" are related with clarity. The early acceptance of neoprene by rubber processors for a variety of products, notwithstanding that its cost was several times that of natural rubber, the commercial development of the synthetic, and the recent expansion program are carefully summarized.

NEW PUBLICATIONS

"Representative Grades of Spheron in Reclaim Tread Stocks." F. H. Amon and H. H. Offutt. Godfrey L. Cabot, Inc., Boston, Mass. February, 1942. 24 pages. Stocks containing three different quantities of reclaim were compared with all crude rubber reference stocks in this study of abrasion, flex cracking, plasticity, and conductivity of compounds containing soft, medium, hard, and extra-hard grades of Spheron in whole tire reclaim loadings. The effect of various grades of Spheron, increasing carbon black loadings, and increasing the quantity of reclaim is shown in charts and summaries of standard tests. The results indicated that for resistance to cracking and abrasion 55 parts black on 100 parts of crude rubber is the optimum loading in compounding tread-type stocks with whole tire reclaim. Medium grades of Spheron were found to offer the best compromise between resistance to cracking and abrasion at all-reclaim additions and all-carbon black loadings.

"Occupations in Rubber." American Job Series. No. 26. Charles W. Ufford. Science Research Associates, 1700 Prairie Ave., Chicago, Ill. 49 pages. The coordinated material in this publication offers to job seekers effective orientation in the development and manufacturing processes of the rubber industry. Various types of work are described, and an occupational chart shows the wide possibilities for employment. The requirements for factory, supervisory, technical, merchandising, and foreign positions are outlined. Occupational hazards, hours and earnings, advancement opportunities, the future of the industry, and other factors are surveyed, and it is pointed out that mechanical goods is a rapidly growing branch of the industry.

"Rubber Data for the Engineer." British Rubber Publicity Association, 19 Fenchurch St., London, E.C.3, England. This handy circular chart, on proper alinement of an arrow, shows the properties of various types of compounded rubber and their applications. It is supplied gratis.

"The Vanderbilt News." Vol. 12, No. 2. March-April, 1942. R. T. Vanderbilt Co., Inc., 230 Park Ave., New York, N. Y. 22 pages. This issue discusses some of the effects of the compounding of reclaimed rubber. It gives the results of standard tests of various compounds with respect to fillers in whole tire reclaim, alkali process; whole tire reclaim, acid process; inner tube reclaim; and other compounds. Publication of the *News* is suspended with this issue for an indeterminate time, but results of the laboratory experiments of the Vanderbilt company will be released from time to time.

"Phillips Hydrocarbons." Bulletin 96. Phillips Petroleum Co., Bartlesville, Okla. March, 1942. 64 pages. This booklet presents a summary in condensed form of the specifications, typical properties, uses (excluding fuel), and other pertinent data of the paraffin, cycloparaffin, olefin, diolefin, aromatic and other special hydrocarbon products of the company. Isobutylene and butadiene are among the commercially available products described. Besides there are four pages of tabulated data on the physical properties of various hydrocarbons.

"Cleaning, Repairing, and Storage of Household Rubber Goods." Helen G. Wheeler. Division of Textiles and Clothing, Bureau of Home Economics, United States Department of Agriculture, Washington, D. C. 21 pages. The causes of deterioration of rubber are briefly discussed and methods of cleaning, disinfecting, preserving, and repairing such articles as footwear, clothing, garden hose, electric cord, gloves, druggists' sundries, rubber flooring, and garments containing rubber thread are described in this mimeographed government release.

"Goodrich Almanac for Farm and Home." 1942. B. F. Goodrich Co., Akron, O. 68 pages. **"How to Get Maximum Performance and Longer Wear from Tractor and Implement Tires."** 24 pages, and **"How to Get More Mileage From Your Tires and How to Keep Your Trucks Operating More Economically."** 52 pages. Firestone Tire & Rubber Co., Akron. **"Air Raid and Blackout Precautions for the Protection of Windows."** Bulletins No. 1 and 2. Pittsburgh Plate Glass Co., Pittsburgh, Pa. 8 pages. **"Who Wants the Closed Shop?"** Russell L. Greenman, 12 pages, and **"How to Fight Fires Resulting from Air Attacks."** Harry Desmond Farren, 8 pages. National Foremen's Institute, Inc., Deep River, Conn. **"Instructor's Manual"** accompanying the motion picture "Fighting the Fire Bomb." Safety Research Institute, 420 Lexington Ave., New York, N. Y. 16 pages. **"Testing in Modern Industry."** United States Testing Co., Inc., Hoboken, N. J. 108 pages. **"List of American Standards."** American Standards Association, 29 W. 39th St., New York. February, 1942. 16 pages. **"Surface Area and Properties of Carbon Black."** By W. R. Smith, F. S. Thornhill, and R. I. Bray. Reprinted from *Industrial and Engineering Chemistry*, October, 1941. Godfrey L. Cabot, Inc., 77 Franklin St., Boston, Mass. 12 pages. **"Dings Magnetic Drums and Drum Type Separators."** Catalog No. 660. Dings Magnetic Separator Co., Milwaukee, Wis. 36 pages.

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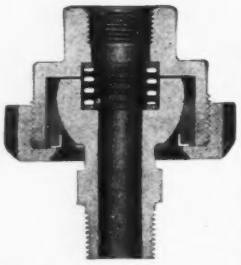

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STILL WANTED—A RECLAIM POLICY! F. N. Pickett, *Rubber Age (London)*, Mar., 1942, pp. 7-8.

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CLARIFYING EFFICIENCY OF DIATOMACEOUS FILTER AIDS. H. B. Cummins, *Ind. Eng. Chem.*, Apr., 1942, pp. 403-11.

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PHYSICAL PROPERTIES OF POLYSTYRENE AS INFLUENCED BY TEMPERATURE. T. S. Carswell, R. F. Hayes, and H. K. Nason, *Ind. Eng. Chem.*, Apr., 1942, pp. 454-57.

GENERAL PRINCIPLES OF COMPOUNDING WITH RECLAIM. P. M. Elliott, *Rubber Age* (*N. Y.*), Apr., 1942, pp. 35-36.

NAFTOLEN AS A COMPOUNDING MATERIAL FOR SYNTHETIC RUBBERS OF THE BUNA N TYPE. F. Rostler and V. Mehner, *Rubber Age* (*N. Y.*), Apr., 1942, pp. 27-31. (To be continued.)

A NEW METHOD FOR EXTENDING THE VOLUME OF LATEX. P. M. Fleuriel, *Rubber Age* (*N. Y.*), Apr., 1942, pp. 32-34.

THE ESTIMATION OF SMALL PERCENTAGES OF RUBBER IN FIBROUS MATERIALS. C. M. Blow, *India-Rubber J.*, Mar. 14, 1942, pp. 7-10.

THE LOST BRITISH RUBBER PLANTATIONS *India-Rubber J.*, Apr. 4, 1942, pp. 1-2.

SYNTHETIC RESINS AND SYNTHETIC RUBBERS. P. O. Powers, *Chem. & Eng. News*, Apr. 25, 1942, pp. 536-38.

Tire and Tube Quotas for April, 1942

STATE AND TERRITORY QUOTAS

United States and Territories	Passenger, Motorcycle, Tires and Tubes			Truck, Bus, Farm Tractor, Etc., Tires and Tubes		
	New Tires	Retreads	New Tubes	New Tires	Retreads	New Tubes
Alabama	1,652	7,646	4,649	4,258	3,796	4,027
Arizona	640	2,960	1,800	1,778	1,585	1,681
Arkansas	1,053	4,871	2,962	2,747	2,449	2,598
California	7,846	36,307	22,077	21,650	19,301	20,476
Colorado	1,219	5,639	3,429	3,327	2,966	3,146
Connecticut	1,414	6,545	3,980	4,069	3,627	3,848
Delaware	220	1,016	618	606	540	573
District of Columbia	597	2,764	1,680	1,614	1,438	1,526
Florida	2,313	10,701	6,507	6,057	5,400	5,729
Georgia	2,354	10,892	6,623	6,111	5,448	5,780
Idaho	485	2,245	1,365	1,208	1,157	1,227
Illinois	5,527	25,576	15,551	15,277	13,619	14,448
Indiana	2,828	13,087	7,957	7,972	6,973	7,473
Iowa	2,271	10,507	6,389	6,065	5,407	5,736
Kansas	1,832	8,479	5,156	4,715	4,204	4,459
Kentucky	1,404	6,498	3,951	3,893	3,471	3,682
Louisiana	1,610	7,450	4,530	4,186	3,732	3,959
Maine	578	2,674	1,626	1,642	1,464	1,553
Maryland	1,295	5,992	3,643	3,555	3,169	3,362
Massachusetts	2,890	13,375	8,133	8,324	7,421	7,873
Michigan	4,294	19,872	12,083	11,752	10,477	11,114
Minnesota	1,961	9,076	5,518	4,951	4,637	4,794
Mississippi	1,115	5,157	3,136	2,894	2,580	2,737
Missouri	2,908	13,455	8,181	8,876	7,913	8,395
Montana	557	2,579	1,568	1,463	1,304	1,384
Nebraska	1,176	5,440	3,308	3,132	2,792	2,962
Nevada	228	1,054	641	781	563	672
New Hampshire	382	1,769	1,075	912	973	943
New Jersey	2,828	13,087	7,957	7,812	6,965	7,388
New Mexico	599	2,770	1,684	1,601	1,427	1,514
New York City	2,787	12,898	7,843	7,646	6,816	7,231
New York (other than New York City)	5,224	24,172	14,698	13,347	13,682	14,515
North Carolina	2,612	12,088	7,350	6,766	6,032	6,399
North Dakota	475	2,198	1,336	1,193	1,063	1,128
Ohio	5,249	24,288	14,769	14,393	12,831	13,612
Oklahoma	2,251	10,415	6,333	5,499	4,903	5,201
Oregon	1,353	6,259	3,806	3,570	3,406	3,488
Pennsylvania	6,453	29,862	18,158	17,500	15,601	16,550
Rhode Island	537	2,484	1,510	1,549	1,381	1,465
South Carolina	1,311	6,068	3,690	3,405	3,035	3,220
South Dakota	526	2,436	1,481	1,509	1,345	1,427
Tennessee	1,899	8,790	5,345	4,926	4,391	4,658
Texas	7,102	32,866	19,984	17,863	15,924	16,894
Utah	579	2,679	1,629	1,582	1,411	1,496
Vermont	279	1,292	786	813	725	769
Virginia	1,822	8,434	5,128	4,780	4,530	4,655
Washington	1,611	7,455	4,533	4,477	3,991	4,234
West Virginia	1,095	5,067	3,081	3,018	2,690	2,854
Wisconsin	1,910	8,837	5,374	5,045	4,720	4,883
Wyoming	269	1,244	575	737	657	697
Territories						
Alaska	31	143	87	86	77	81
Puerto Rico	134	620	377	351	313	332
Virgin Islands	10	48	29	42	24	33
Panama Canal Zone	41	191	116	108	96	102
Total	101,636	470,317	285,977	275,523	246,442	260,983

REMINDER—After May 1 the new address of INDIA RUBBER WORLD will be 386 Fourth Ave., New York, N. Y., (Fourth Floor).

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APPLICATION

United States

2,270,902. **Anti-Vibration Means** Consisting of Two Resilient Spacing Means and a Free Floating Member Interposed Having Sufficient Weight to Provide Enough Inertia for Damping the Vibrations. G. A. Rubissow, New York, N. Y.

2,270,944. **Sandblasting Stencil** Comprising an Abrasive Resistant Sheet Including Tough Vulcanized Rubber, and an Admixture of Shellac, and an Adhesive Coating on the Back Face of the Sheet. C. E. Frick, assignor to Van Cleef Bros., a partnership consisting of N., F., and P. Van Cleef, all of Chicago, Ill.

2,270,945. **Sandblasting Stencil** Comprising a Composite Sheet Consisting of an Abrasive Resistant Outer Layer Including Vulcanized Rubber and an Admixture of Shellac, and an Inner Layer Including Unvulcanized Rubber and Shellac and an Adhesive Coating between the Layers. C. E. Frick, assignor to Van Cleef Bros., a partnership consisting of N., F., and P. Van Cleef, all of Chicago, Ill.

2,271,016. **Anti-Vibrating Resilient Engine Support** Comprising an Outer and an Inner Frame Bonded by a Layer of Elastic Material. M. F. A. Julien, Paris, France.

2,271,060. **Oiltight Seal** with a Resilient Gasket for Flexible Couplings. L. B. Case, assignor to John Waldron Corp., both of New Brunswick, N. J.

2,271,088. **Rubber Heel.** F. B. Melley, Boston, assignor to B. MacEachern, Somerville, both in Mass.

2,271,118. **Rubber Tube** Adapted for a Rinsing Apparatus. I. L. Caruolo, Johnston, R. I.

2,271,124. **Printing Roller Surface** Composed of a Vulcanized Mixture of Rubber and a Copolymer of Butadiene and Acrylonitrile. A. E. Juve and B. S. Garvey, both of Akron, O., assignors to B. F. Goodrich Co., New York, N. Y.

2,271,125. **Offset Printing Blanket** Comprising a Rubber Body Adhered on One Side to a Fabric Base and on the Other to a Layer of Rubber and a Copolymer of Butadiene and Acrylonitrile. A. E. Juve, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,271,129. **Non-Flood Cell Cover Assembly** for a Container for Electrolyte. G. A. Paddock, Stow, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,271,132. **Buckle** with an Elastic Cushion Belt-Securing Member. E. Thoreson, Pittsburgh, Pa.

2,271,133. **Buckle and Latch Mechanism** with an Elastic, Compressed Belt-Engaging Element. E. Thoresen, Pittsburgh, Pa.

2,271,161. **Container Package** Having a Brim of Bulbous Bead-Like Cross-Section and a Gasket of Rubber-Like Material Interlocked with the Brim. R. G. Peck, Jr., assignor to Aridor Co., both of Chicago, Ill.

2,271,166. **Belt Conveyer Idler** with a Resilient, Transversely Split Tire. C. R. Weiss, Indianapolis, Ind., assignor to Link-Belt Co., a corporation of Ill.

2,271,337. **Pneumatic Tire** for Soft, Muddy Soils. J. E. Hale, Akron, and A. Hargraves, Silver Lake, assignor to Firestone Tire & Rubber Co., Akron, all in O.

2,271,339. **Tire Repair Plug.** P. E. Hawkinson, assignor to Paul E. Hawkinson Co., both of Minneapolis, Minn.

2,271,349. **Radiator Hose and Drain** with Pet Cock Having a Valve Body of Molded Resilient Rubber. C. Saurer, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,271,370. **Tire Valve Deflator** with a Body of Resilient Material. H. Z. Gora, Bridgeport, Conn., assignor to Jenkins Bros., New York, N. Y.

2,271,432. **Tire and Wheel Structure.** R. J. Hull, Akron, and W. F. Billingsley, Silver Lake, both in O., assignors to B. F. Goodrich Co., New York, N. Y.

2,271,474. **Shoe Finding** Comprising an Absorptive Base Impregnated with a Natural or Synthetic Rubber and a Hydrogenated Rosin or Hydrogenated Rosin Ester. C. H. Boys, Drexel Hill, Pa., assignor to Hercules Powder Co., Wilmington, Del.

2,271,492. **Moisture-Proofing Composition** Containing from 4 to 6% of a Powdered Resinous Rubber, Hydrogenated Fat, and Upwards of 59% of a Wax. W. H. Bryce, Memphis, Tenn., assignor to Dixie Wax Paper Co., Dallas, Tex.

2,271,551. **Rotary Agitator** for Suction Cleaners Including Brush Elements in a Resilient Flexible Mounting. H. E. Hoover, Glencoe, Ill., assignor to Hoover Co., North Canton, O.

2,271,567. **Shaft Coupling** with a Resilient Housing. G. L. Olson, Arlington, Mass.

2,271,568. **Resilient Torque Device** Having a Resilient Housing. G. L. Olson, Arlington, Mass.

2,271,714. **Laminated Flexible Containers** Comprising a Strip of Fibrous Material and a Strip of Sheet Rubber in Vulcanizable Form, and Connected by Areas of Adhesive. D. Ray, Beverly Hills, Calif.

2,271,719. **Ampoule Syringe** Having a Resilient Imperiorate Penetrable Partition. A. E. Smith, Los Angeles, Calif.

2,271,760. **Deicer.** R. S. Colley, Kent, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,271,777. **Sealing Structure** for Sealing an Annular Space between Pipe Members Comprising an Endless Band of Resilient Material. T. D. Nathan, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,271,918. **Sanitary Silent Garbage Can** with a Pad of Resilient Spongy Material under the Cover. M. Glowka, New York, N. Y.

2,271,927. **Tourniquet** with a Resilient Pad Mounted in the Tubular Band. E. S. Saighman, Waverly, Mo.

2,271,931. **Hose Joint** in Which No Metal Is Exposed, Consisting of Two Rubber Hose Ends Insertable into Each Other. F. B. Williamson, Jr., New Hope, Pa., and T. A. Welger, assignors to Whitehead Bros. Rubber Co., both of Trenton, N. J.

2,271,935. **Vibration Damper** on a Line Conductor. W. B. Buchanan and G. B. Tebo, both of Toronto, Ont., Canada, assignors to General Cable Corp., New York, N. Y.

2,271,936. **Bell and Spigot Pipe Joint** Having a Rubber Gasket. H. Y. Carson, Tarrant, Ala.

2,271,946. **Transparent Protective Covering** for Display of Articles, Provided with a Transparent Pressure Sensitive Adhesive Coating on One Side. S. S. Miller, Chicago, Ill.

2,271,957. **Feed Roller for Cutters** Having a Rubber Tire Adapted to Engage Material on the Conveyer. E. W. Saiberlich, assignor to Fox River Tractor Co., both of Appleton, Wis.

2,272,016. **Engine Mounting** with a Cylindrical Resilient Bushing. W. Lytle, Hillsboro, Oreg.

2,272,023. **Foundation Garment.** I. Rosner, New York, N. Y.

2,272,029. **Bearing and Seal** for a Washing Machine Comprising a Normally Flat, Elastic Sheet Member Adapted to Seal a Wall Having a Shaft. B. A. Benson, assignor to Chicago Electric Mfg. Co., both of Chicago, Ill.

2,272,036. **Golf Ball Cover Stock** Consisting of an Intimate Mixture of Pigments, a Hard Thermoprene, and a Rubbery Material (Formed by Blending Polyisobutylene and Rubber, or Glue and Rubber), the Ball Cover Being Resistant to Cutting, Cracking, and of Good Putting Characteristics. J. B. Dickson, Northampton, and R. A. Stafford, Chicopee, both in Mass., assignors to A. G. Spalding & Bros., Inc., New York, N. Y.

2,272,115. **Rubber Ring Pipe Joint** for Spigot and Faucet Ended Pipes. C. C. Halkyard, assignor to Hume Pipe Co., (Australia) Ltd., both of Melbourne, Australia.

2,272,128. **Marine Propeller** with Water-Lubricated Non-Metallic Bearings. A. Osbourne, Brooklyn, N. Y.

2,272,270. **Cushioned Mounting for Wheels.** A. S. Krotz, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,272,317. **Decorated Slightly Elastic Fabric** Adapted to Be Tensioned in Use. C. J. Davies, assignor to National Automotive Fibres, Inc., both of Detroit, Mich.

2,272,351. **Faucet** with a Rubber Washer. C. Polcari, Boston, Mass.

2,272,359. **Fluid Pressure Braking System.** H C. Swift, assignor to Hydraulic Brake Co., both of Detroit, Mich.

2,272,360. **Fluid Pressure Booster.** H. C. Swift, assignor to Hydraulic Brake Co., both of Detroit, Mich.

2,272,373. **Assembling a Shoe** Having a Resilient Sponge Rubber Outsole. B. Jayne, New York, assignor of one-half to D. Calderazzo, Dolgeville, both in N. Y.

2,272,426. **Railway Truck Bolster Center Plate** with a Cushion of Rubber-Like Material for Absorbing Lateral Shocks. K. F. Nystrom, Milwaukee, Wis., E. S. Beckette, East St. Louis, Ill., and V. L. Green, Milwaukee; Beckette assignor to General Steel Castings Corp., Granite City, Ill.

2,272,481. **Apparatus for Massaging Parts of the Body,** Including a Tube Closed at One End for Engirdling the Body Part and Means to Provide a Seal around the Part. E. B. Rinkes, Canton, and E. Meadow, Massillon, both in O.

2,272,482. **Making Shoe Filler Compositions,** Which Comprises the Steps of Heating Fine Oil Foots to Expel the Volatile Matter therefrom, Swelling Unmilled Rubber to a Gelatinous Condition with a Volatile Liquid Hydrocarbon Solvent, and Mixing the Resulting Materials with Comminuted Body Material, as a Binder. E. D. Sackett, West Somerville, Mass., assignor of one-half to North American Holding Corp., and one-half to Parshad Holding Corp., both of Syracuse, N. Y.

2,272,549. **Container Spout** Consisting of an Annulus of Resilient Material. R. E. Deschner, Los Angeles, Calif.

2,272,615. **Electric Power Cable** Covered with a Tape Impregnated with a Polymer, Basted at Intervals with a Monomer and Subsequently Polymerized. T. R. Scott and J. K. Webb, both of London, England, assignors to International Standard Electric Corp., New York, N. Y.

2,272,639. **Railway Car Vibration Isolating Mounting.** W. A. Jack, 3rd, North Plainfield, N. J., assignor to Johns-Manville Corp., New York, N. Y.

2,272,653. **Self-Sealing Cap** of Resilient Material. A. M. Andrews, Modesto, Calif.

2,272,744. **Electric Hand Lantern** Having Cell Partitions and a Lamp Housing Formed in One Piece of Resilient Material. J. T. Helling, Auckland Park, Johannesburg, South Africa.

2,272,765. **Tennis Practice Device** Comprising a Resilient Flexible Body with a Target Element at the End of the Upper Portion. J. D. Beeson, Los Angeles, and H. Z. Buck, Glendale, both in Calif.

2,272,811. **Fluid-Seal Pipe-Joint Assembly** Including a Resilient Gasket Having One End Exposed to the Fluid-Pressure, and a Resilient Wedge Gasket. T. D. Nathan, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,272,812. **Fluid-Seal Pipe-Joint Assembly** with Resilient Wedge-Acting Packing Means. W. B. Neal, Oak Park, Ill., assignor, by mesne assignments, to B. F. Goodrich Co., New York, N. Y.

2,272,873. **Grinding Wheel** Comprising Abrasive Grains Bonded with the Condensation Product of a Primary Aromatic Amine and an Aldehyde (Formaldehyde or Furfural), Condensed in the Presence of an Acid at Least as Strong as Phosphoric Acid and Reacted by Heating with an Organic Aliphatic Chlorinated Polymer (Polyvinyl Chloride, Rubber Hydrochloride, Chlorinated Rubber, Chlorinated Polyisobutylene, or Polyvinylidene Dichloride). S. S. Kistler, West Boylston, assignor to Norton Co., Worcester, both in Mass.

2,272,879. **Tire Tread Construction.** A. Hargraves, Silver Lake, assignor to Firestone Tire & Rubber Co., Akron, both in O.

2,272,882. **Apparatus for Assembling Spark Plugs** with Resilient Means Interposed between the Positioning Sleeve and Centering Means. A. M. Brown, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,272,884. **Sponge Rubber Cushioning Pads** in a Crating Combination for Use in Transferring a Heavy Article Having a Relatively Easily Broken Coating Material on Its Surface. L. H. Zimmerman, Beaver Dam, Wis., assignor of one-tenth to Firestone Tire & Rubber Co., Akron, O.

2,272,886. **Pneumatic Tube and a Rubber Bodied Valve Assembly.** R. F. Wilson, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,272,891. **Tire Tread** Having a Resilient Tubular Structure Mounted in Grooves Considerably below the Surface of the Tread and Extending Circumferentially of the Tire. W. S. Coben, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,272,896. **Safety Inner Tube Valve.** C. S Pidgeon, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,272,897. **Vehicle Gear Shift Lever and a Molded Non-Metallic Cover Bonded thereto.** E. F. Riesing, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,272,898. **Storage Battery Filling and Venting Device.** L. E. Olcott, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,272,900. **Resilient Connector** with Tubular Rubber Cushions. C. S. Saurer, assignor to Firestone Tire & Rubber Co., both of Akron, O.

Dominion of Canada

402,540. **Tire Tread** Formed with Anti-Skid and Traction Projections and Having Circumferential Series of Transverse J-Shaped Slits, the Rubber Embraced by the Hook-Like Portions of the J-Slits Being Adapted Automatically to Be Displaced from the Tread When the Tire Wears Down to the Hooks. Seiberling Rubber Co., Barberton, assignee of H. P. Schrank, Munroe Falls, both in O., U. S. A.

402,553. **Printing Member** Having a Smooth Operating Surface Comprising a Plasticized Copolymer Resin of Vinyl Chloride and Vinyl Acetate. United States Rubber Co., New York, N. Y., U. S. A., assignee of Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of G. E. Hulse, Jr., Passaic, N. J., U. S. A.

402,586. **Anti-Skid Shoe Device.** L. K. Frolich, Louisville, Nebr., U. S. A.

402,587. **Tire Repair Patch** Comprising Two Series of Cord-Reenforced Ply Members Ar-

ranged together with the Plies of One Series Alternately Superimposed upon the Plies of the Other Series, the Cords of Each Ply Lying at Right Angles to the Cords of the Adjoining Plies. A. E. Garrett, Grand Coulee, Wash., U. S. A.

402,589. **Ski-Pole Grip** of Highly Elastic Rubber. S. Gerber, Seattle, Wash., U. S. A.

402,591. **Rotary Plug Valve** Having a Seat Member Consisting of an Externally and Internally Cylindrical Rubber Ring. L. McK. Glen, Durban, Natal, South Africa.

402,592. **Multiple Service Tap,** Consisting of a One-Piece Body of Molded Soft Resilient Material Having a Plurality of Intercommunicating Slots. W. P. Herman, Pawtucket, R. I., U. S. A.

402,616. **Belt Conveyer** with a Moving Preformed Tube Having the Elastic Characteristics of Rubber and Formed with a Material Carrying Bore and Having a Longitudinally Extending Slit-Like Opening through the Wall Thereof. Bancroft Holdings, Ltd., Hamilton, Ont., assignee of H. S. Johns, Cleveland, O., U. S. A.

402,655. **Curing Concrete** by Applying to the Surface of the Freshly Placed Wet Concrete a Non-Aqueous Solution of Chlorinated Naphthalene, and a Compound Comprising Chlorine-Containing Synthetic Resins Derived from the Rubber Hydrocarbon and Chlorine-Containing Vinyl Resins, Whereby the Evaporation of Water from the Concrete Is Greatly Retarded and a Coating Which Permanently Adheres to the Surface of the Concrete Is Formed. Master Builders Co., Cleveland, assignee of E. W. Scripture, Jr., Shaker Heights, both in O., U. S. A.

402,693. **Ice Bag** Comprising a Chamber to Receive Ice, a Second Chamber for the Water Formed by the Melting Ice, and Means for Draining the Water. P. J. Rabil, inventor, and J. Helel, assignee of 30% of the interest, both of Montreal, P. Q.

402,709. **Orthopedic Sole, Heel, and Shank.** A Fisch, Guelph, Ont.

402,711. **Shoe** for Mountain Work, Comprising a Rubber Outsole Provided with Spike-Acting Extensions. V. Bramani, Milan, Italy.

United Kingdom

542,958. **Rotatable Hose Couplings** for Sucking or Blowing Devices, e.g., Vacuum Cleaners. N. V. Van Der Heem.

543,010. **Light Buoys** for Seadromes. Westinghouse Electric International Co.

543,013. **Flexible Joints.** Armstrong's Patents Co., Ltd., and F. G. G. Armstrong.

543,015. **Fluid-Sealing and Dust-Excluding Devices** for Shafts, Bearings, Etc. G. Angus & Co., Ltd., and A. Procter.

543,043. **Abrasive Bodies.** Norton Grinding Wheel Co., Ltd.

543,053. **Rubber-Soled Footwear.** Fabbriche Riunite Industria Gomma Torino W. Martiny Industria Gomma Spiga-Sabit-Life.

543,123. **Resilient Engine Mountings.** United Aircraft Corp.

543,236. **Tires.** Tyresoles, Ltd., (P. E. Hawkinson).

PROCESS

United States

2,272,343. **Manufacturing Rubber Tubing** in Continuous Lengths by Forming Unvulcanized Rubber into a Ribbon, Folding It, Shearing the Excess Rubber at the Free Edges and Simultaneously Causing the Edges to Adhere to Each Other, Joining the Edges by Pressure, and Vulcanizing. J. A. Kelly, Riverside, R. I., assignor to Davol Rubber Co., a corporation of R. I.

2,272,637. **Recapping Tires.** E. A. Glynn, assignor to Super Mold Corp. of California, both of Lodi, Calif.

2,272,880. **Rubber Thread.** H. W. Greenup, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,272,883. **Fan Belts** Having Reenforcing Cords Totally Embedded therein. W. E. Haggan, Barberton, assignor to Firestone Tire & Rubber Co., Akron, both in O.

2,272,892. **Vulcanizing Tires.** by Admitting Steam under Pressure to the Core to Effect a Progressively Increasing Heating of the Interior of the Tire at a Uniform Rate While the Pressure within the Tire Is Progressively Reduced at a Uniform Rate. R. S. Taylor and G. P. Bosomworth, assignors to Firestone Tire & Rubber Co., all of Akron, O.

2,272,895. **Making Inner Tubes** by Forming an Endless Tube of Unvulcanized Rubber Composition with Air Entrapped Therein, Localizing the Air in the Tube to Form a Blister That Holds Opposite Walls of the Tube in Spaced Relation, and Then Forming an Aperture in One of the Walls in the Region of the Blister. H. D. Stevens, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,273,148. **Composite Elastic and Porous Fabric** Consisting of a Strong and Heavy Woven or Knitted Textile Fabric and a Fine Textile Fabric Joined Together by Means of Latex Rubber Applied thereto by Spraying. F. F. Schwartz and M. A. Chavannes, both of Paris, France, assignors, by mesne assignments, to American Ecla Corp., Dover, Del.

2,273,283. **Making a Hollow Rubber Tire,** Including the Steps of Removing the Metal Core through the Tread Portion of the Tire Body and Applying a Continuous Band of Uncured Tread Rubber. P. O. Pfeiffer, assignor to General Tire & Rubber Co., both of Akron, O.

2,273,364. **Improved Method of Making Rubber Hydrochloride Film** by Coating at Least a Portion of the Film with Abrasive before Twisting or Rolling It. G. D. Mallory, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,273,452. **Bringing Two Rubber Hydrochloride Surfaces Together and Uniting a Limited Area of the Surfaces.** J. E. Snyder, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,273,464. **Splicing Rubber Articles.** J. F. Campbell, Cuyahoga Falls, and J. F. Ringlein, Akron, both in O., assignors to Wingfoot Corp., Wilmington, Del.

2,273,560. **Container Material** Comprising a Layer of Solvent-Free Thermoplastic Resinous Varnish Bonded in the Presence of a Solvent to a Sheet of Paper and an Exposed, Superimposed Thermoplastic Sheet Bonded to the Solvent-Free Surface of the Varnish. W. C. Calvert, Gary, Ind., assignor to Wingfoot Corp., Wilmington, Del.

2,273,995. **Rubber Gloves** with a Lining of Finely Divided Fibers. J. Rogerson, and F. W. Warren, both of Manchester, assignors to Dunlop Rubber Co., Ltd., London, both in England.

2,274,150. **Rubber Hydrochloride Films.** G. C. Mack, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,274,260. **Strip of Undistorted Vulcanized Permeable Hard Rubber Composition.** H. J. Schelhammer, Whitestone, N. Y., and D. H. Coursen, Butler, N. J., assignors to American Hard Rubber Co., New York, N. Y.

2,275,233. **Long Length V-Type Belts.** N. J. Ritzert, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.

Dominion of Canada

402,777. **Making Cellular Rubber Articles** by Frothing an Aqueous Dispersion of Rubber without the Addition of a Foam Stabilizing Agent, Adding a Vulcanizing Agent, Zinc Oxide, and a Latex Gelling Agent to the Froth, and Allowing the Mixture to Gel in a Mold without Collapse. Firestone Tire & Rubber Co., Akron, O., assignor of M. Carter, Trenton, N. J., both in the U. S. A.

402,825. **Tire Tread.** United States Rubber Co., New York, N. Y., assignee of Fisk Rubber Corp., Chicopee, assignee of C. E. Maynard, Northampton, both in Mass., all in the U. S. A.

402,969. **Insulating Tape.** Union Asbestos & Rubber Co., Chicago, assignor of J. L. Mohun, Jr., both of Chicago, and C. Mosier, now deceased, in his lifetime of Oak Park, all in Ill., U. S. A.

403,125. **Dual-Chambered Safety Tire Tube.** Wingfoot Corp., Wilmington, Del., an assignee of C. J. Burkley, Akron, O., both in the U. S. A.

403,147. **Antiseptic Rubber Product.** H. Becher, J. Ross, and J. Stein, co-inventors, all of New York, N. Y., U. S. A.

403,167. **Rubber Thread.** T. L. Shepherd, London, England.

403,189. **Floor Mat** of Pile Fabric and Vulcanizable Stock United under Pressure without Matting the Pile. Baldwin Rubber Co., assignee of D. R. Cotterman, both of Pontiac, Mich, U. S. A.

403,203. **Fibrous Product Coating** Consisting of a Plasticized Film of a Vinyl Resin (Polymerization Product of Vinyl Chloride and Vinyl Acetate). Carbide & Carbon Chemicals, Ltd., Toronto, Ont., assignee of F. Groff, Lakewood, O., U. S. A.

403,220. **Molding Porous Rubber Articles** by Coagulating the Surface of a Body of Foam to Prevent Breakdown of the Porous Surface Structure, and Then Coagulating the Body of the Foam. Firestone Tire & Rubber Co., assignee of H. W. Greenup and B. R. Whaley, co-inventors, all of Akron, O., U. S. A.

403,355. **Thickening Latex** Containing Less Than 0.5% Ammonia by Mixing Zinc Oxide with the Latex and Then Admixing a Small Amount of Casein into the Mixture. Firestone Tire & Rubber Co., Akron, O., assignee of H. B. Morris, Somerset, Mass., both in the U. S. A.

403,356. **Thickened Latex Composition** Comprising Latex Having about 0.2% Ammonia therein, and Oleic Acid and a Composition Comprising the ½ Sodium Sulphur Ester of a Mixture of Higher Fatty Alcohols (Lauryl and Myristol Derivatives). Firestone Tire & Rubber Co., Akron, O., assignee of H. B. Morris, Somerset, Mass., U. S. A.

403,357. **Making a Composite Vulcanized Rubber-Fabric Article** by Impregnating Cellulosic Fabric with an Aqueous Rubber Dispersion Comprising Soya Bean Protein and an Alkaline Solubilizing Agent. Firestone Tire & Rubber Co., assignee of B. J. Humphrey, both of Akron, O., U. S. A.

403,506. **Safety Inner Tubes.** Firestone Tire & Rubber Co., assignee of H. C. Ickes, both of Akron, O., U. S. A.

403,545. **Fabricated Racket Frame** Comprising Wood Veneer Sheets Impregnated with a Thermoplastic and a Plasticizer and the Whole Vulcanized. Vidal Research Corp., New Rochelle, N. Y., assignee of Aircraft Research Corp., Bendix, N. J., assignee of E. L. Vidal, New York, N. Y., all in the U. S. A.

MACHINERY

United States

2,271,019. **Injection Molding Machine** or Similar Press. P. De Mattia, Passaic, N. J.

2,271,063. **Apparatus and Method for Molding Plastic Materials.** P. De Mattia, Passaic, N. J.

2,271,130. **Buffer and Shaper** for Tires, Etc. R. O. Pearson, Birmingham, Ala.

2,271,347. **Drier** for Continuous Moving Web of Wet Material. W. T. Runals, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,271,405. **Apparatus to Remove a Curing Bag from a Tire Casing.** W. J. Strong, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,271,416. **Apparatus for Handling Strip Material.** E. A. Davis, Akron, and J. F. Morse, Hudson, both in O., assignors to B. F. Goodrich Co., New York, N. Y.

2,271,854. **Cord Stretcher.** R. J. Clarkson, Hogansville, Ga., assignor to United States Rubber Co., New York, N. Y.

2,271,855. **Steam Curing Apparatus** for Vulcanizing Uncured Rubber Parts of Tires. A. B. Cleveland, Los Angeles, E. G. Haag, Alhambra, and C. L. Ray, Los Angeles, all in Calif.; Haag and Ray assignors to Cleveland.

2,272,069. **Punch Apparatus** for Rubber Articles. P. A. Raiche, Providence, R. I., assignor to Davol Rubber Co., a corporation of R. I.

2,272,090. **Compressible Sphere-Smoothing Apparatus.** A. F. Larabee, Greensburg, Pa., assignor to Pennsylvania Rubber Co., a corporation of Pa.

2,272,175. **Apparatus and Method for Filtering.** H. F. Jordan, Nutley, N. J., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,272,231. **Retreading Vulcanizer.** W. P. Voth, Coventry Township, assignor to Akron Standard Mold Co., Akron, both in O.

2,272,704. **Apparatus and Method for Making Corrugated Tubes.** W. G. Harding, Fair Lawn, N. J., assignor to United States Rubber Co., New York, N. Y.

2,272,881. **Tube Splicer.** H. D. Stevens, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,272,887. **Tire Vulcanizing Press.** R. W. Allen, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,272,893. **Tire Inspection Apparatus** Using an X-Ray Tube and a Fluoroscopic Screen. G. P. Bosomworth, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,272,894. **Apparatus to Mount Valve Stems** on Inner Tubes. R. D. Hulslander, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,272,901. **Latex Beater.** M. Carter, Yardley, Pa., assignor to Firestone Tire & Rubber Co., Akron, O.

2,273,082. **Apparatus for Producing Multifilament Rubber Threads.** L. D. Aldrich, North Providence, R. I., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,273,185. **Apparatus to Secure Valve Stems to Rubber Tubes.** M. L. Engler and W. J. Breth, assignors to General Tire & Rubber Co., all of Akron, O.

2,273,206. **Apparatus and Method for Incorporating Fibrous Material in Rubber.** J. W. Kuhn, Akron, O.

2,273,463. **Inner Tube Splicer.** J. F. Campbell, Cuyahoga Falls, and J. F. Ringlein, Akron, both in O., assignors to Wingfoot Corp., Wilmington, Del.

2,273,533. **Apparatus to Hold Rubber Tire Stock during Cutting Operations thereon.** G. L. Mather, assignor to Pharis Tire & Rubber Co., both of Newark, O.

2,275,603. **Perforating Apparatus and Method.** V. H. Bodle, assignor to Mishawaka Rubber & Woolen Mfg. Co., both of Mishawaka, Ind.

Dominion of Canada

402,436. **Apparatus for Continuously Applying a Viscous Coating Material** to a Rubber Covering of a Conductor. C. W. Abbott, Larchmont, N. Y., U. S. A.

402,482. **Apparatus to Make Composite Floor Mats** of Vulcanizable Stock and Pile Fabric. Baldwin Rubber Co., assignee of D. F. Collins, both of Pontiac, Mich., U. S. A.

402,502. **Abrasive Drum Tool.** Dayton Rubber Mfg. Co., assignee of N. J. Ritzert, both of Dayton, O., U. S. A.

402,726. **Full-Circle Tire Retread Vulcanizer.** J. C. Heintz, Lakewood, O., U. S. A.

402,823. **Tire Tread Making Machine.** United States Rubber Co., New York, N. Y., assignee of Fisk Rubber Corp., Chicopee, assignee of W. V. Smith, South Hadley Falls, both in Mass., both in the U. S. A.

402,824. **Tire Vulcanizer.** United States Rubber Co., New York, N. Y., assignee of Fisk Rubber Corp., Chicopee, assignee of C. E. Maynard, Northampton, both in Mass., both in the U. S. A.

402,869. **Form for Making Hollow Seamless Rubber Pants.** A. N. Spanel, New York, N. Y., U. S. A.

402,968. **Insulating Tape Making Apparatus.** Union Asbestos & Rubber Co., assignee of J. L. Mohun, Jr., both of Chicago, and C. Moser, deceased, in his lifetime of Oak Park, both in Ill., U. S. A.

403,170. **Hollow Rubber Goods Manufacture.** S. C. Williams, Toronto, Ont.

403,213. **Tire Balance Tester.** Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., assignee of E. T. Braund, Birmingham, Warwickshire, England.

403,221. **Latex Frothing Apparatus.** Firestone Tire & Rubber Co., Akron, O., U. S. A., assignee of Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., assignee of H. W. Greenup, Akron, and N. Johnston, Los Angeles, Calif., U. S. A., co-inventors.

403,280. **Apparatus to Produce a Multifilament Rubber Thread.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of L. D. Aldrich, North Providence, R. I., U. S. A.

403,354. **Solid Rubber Thread Forming Apparatus.** Firestone Tire & Rubber Co., assignee of S. W. Alderfer, both of Akron, O., and H. W. Greenup, Fall River, Mass., co-inventors, both in the U. S. A.

403,503. **Tire Vulcanizer** with Removable Cover. Firestone Tire & Rubber Co., assignee of G. P. Bosomworth, both of Akron, O., U. S. A.

United Kingdom

542,268. **Apparatus for Treating Tires.** Consolidated Rubber Manufacturers, Ltd.

542,540. **Apparatus and Processes for Dialysing Latex.** Rubber Stichting.

542,810. **Apparatus to Manufacture Pneumatic Tires.** Dunlop Rubber Co., Ltd., H. Willshaw, H. Smith, and L. S. Blanchard.

CHEMICAL

United States

2,272,396. **Vulcanized Addition Compound of Rubber and an Organic Antiseptic** Which Has a Thihalide Group Having a Phenolic Hydroxy Group, the Compound Having a Surface Antiseptic Effect. H. Becher, J. Ross, and J. Stein, assignors, by direct and mesne assignments, to Antiseptics, Inc., all of New York, N. Y.

2,272,397. **Antiseptic Rubber** Containing the Absorbed and Condensed Vapor of Oxyquinoline. H. Becher, A. S. Keston, and J. Stein, assignors, by direct and mesne assignments, to Antiseptics, Inc., all of New York, N. Y.

2,272,398. **Rubber Compound** Capable of Developing Antiseptic or Therapeutic Properties. H. Becher, J. Stein, and J. Ross, assignors, by direct and mesne assignments, to Antiseptics, Inc., all of New York, N. Y.

2,272,399. **Making Antiseptic Vulcanized Rubber** by Incorporating an Antiseptic into the Rubber Subsequent to Vulcanization. H. Becher, J. Stein, and J. Ross, assignors, by direct and mesne assignments, to Antiseptics, Inc., all of New York, N. Y.

2,272,600. **Composition Rubber** Compounded with a Substantial Proportion of Low-Polymer Coumarone-Indene Resin. F. W. Corkery, Crafton, Pa., assignor to Pennsylvania Industrial Chemical Corp., a corporation of Pa.

2,272,888. **Thermoplastic Resin** Comprising a Mixture of Soft Vulcanized Rubber with an Acyl Halide. F. L. Kilbourne, Jr., assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,272,996. **Plasticizing Polymerized Styrene** by Mixing therewith between 4% and 20% of Phenanthrene. A. J. Warner and A. A. New, both of London, England, assignors to International Standard Electric Corp., New York.

2,273,262. **Polymeric Vinylidene Chloride Product** Stabilized with an Ester of Aconitic Acid. A. W. Hanson and W. C. Goggin, assignors to Dow Chemical Co., both of Midland, Mich.

2,273,321. **Amino Azyl Polysulphides.** P. C. Jones, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,273,322. **Organic Vulcanizing Agent** Containing an Aliphatic Amino Group. P. C. Jones, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,273,323. **Vulcanization Accelerator** Having the Structural Formula $R_1—S—CH_2—N(—R_3)—S—R_2$

Wherein R_1 and R_2 Represent Members of the Class Consisting of 2-Thiazyl and 2-Thiazolinyl Groups, and R_3 Represents an Aliphatic Group. P. C. Jones, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,273,324. **Vulcanization Accelerator** Having the Structural Formula

$$R_1—S—A(—H)—N(—H)—S—R_2$$

Wherein R_1 Is a Thiazolinyl Group, R_2 Is a Thiazyl Group, and A Is a Lower Alkylene Group. P. C. Jones, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,273,424. **Preparation of 2-Mercaptothiazolines.** B. M. Sturgis, Pitman, N. J., and J. J. Verbanc, assignors to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,273,436. **Composition of Halogen** Containing Film-Forming Plastic Material (Chlorinated Rubber, Polyvinyl Chloride, or Chlorobutadiene); and as a Plasticizer therefor, an Acetal of the Type Formula Aryl·X·Alkyl·OH Wherein X Stands for a Member of the Group Consisting of O and S. K. Desamari, Leverkusen-K. G. Werke, and R. Hebermehl, Cologne-Deutz, assignors to I. G. Farbenindustrie A. G., Frankfurt a.M., all in Germany.

2,273,473. **Coloring Rubber Hydrochloride Cements.** J. A. Merrill, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,273,484. **Manufacture of Synthetic Rubber** Comprising Converting Furfurol into Piperylene and Converting the Piperylene into Synthetic Rubber. H. M. E. Guinot, Niort, assignor to Les Usines de Melle, Melle, Deux-Sevres, both in France.

2,273,506. **Reclaiming Vulcanized Scrap Rubber** (Natural Rubber, Polymeric Butadiene-1,3 Hydrocarbons, and Copolymerizates of Butadiene-1,3 Hydrocarbons with Other Copolymerizates) by Heating for from about 10 to about 70 Hours in the Presence of a Solvent to a Temperature of from about 100 to about 140° C. While Bubbling an Oxygen-Containing Gas through the Mix in the Presence of a Monoarylhydrozine. O. Bachle, Cologne, Germany, assignor, by mesne assignments to General Aniline & Film Corp., New York, N. Y.

2,273,593. **Preparation of Synthetic Resinous Products** Consisting in Simultaneously Treating Rubber with Maleic Anhydride and a Phenol at about the Boiling Point of the Phenol. C. A. Redfarn and P. Schidrowitz, assignors to British Rubber Producer's Research Assn., all of London, England.

2,273,682. **Solution of Gamma Polyvinyl Chloride.** R. F. Wolf, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,274,749. **Hydrocarbon Copolymer** Prepared by Polymerizing in the Presence of an Active Halide Polymerization Catalyst a Mixture of an Aliphatic Olefin Having More Than Two Carbon Atoms, and a Mono-Olefinic Hydrocarbon Capable of Polymerization and Containing a Cyclic Nucleus. W. H. Smyers, Westfield, N. J., assignor to Standard Oil Development Co., a corporation of Del.

2,275,135. **Butadiene Extraction** from Hydrocarbon Mixtures Comprising Contacting the Mixture with a Clear Solution of a Cuprous Salt and a Water-Soluble Organic Nitrile, and Recovering the Diolefins from the Solution. E. V. Fasce, Baton Rouge, La., assignor to Standard Oil Development Co., a corporation of Del.

2,275,181. **Converting Olefinic and Aromatic Hydrocarbons into More Saturated Hydrocarbons** by Hydrogenating the Hydrocarbons in the Presence of Metallic Copper and Iron Oxide. V. N. Ipatieff and B. B. Corson, assignors to Universal Oil Products Co., all of Chicago, Ill.

Dominion of Canada

402,911. **Self-Lacquering Articles of Polymerization Products of Vinyl Chloride with Vinyl Acetate.** Carbide & Carbon Chemicals, Ltd., Toronto, Ont., assignee of C. N. Smith, Snyder, N. Y., U. S. A.

402,919. **Producing Vulcanized Rubber Products** by Vulcanizing the Rubber in the Presence of 4-Mercapto-Quinazoline. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of L. H. Howland, Nutley, N. J., U. S. A.

402,920. **Crude Rubber** Having a Nitrogen Content of at Least 0.37% and an Ash of Natural Origin of Not More Than 0.12%, the Rubber Containing Combined Formaldehyde. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of J. McGavack, Leonia, and C. E. Linscott, Ridgewood, co-inventors, both in N. J., U. S. A.

402,921. **Rubber Hydrochloride Composition** Containing a Triaryl, Phenyl, or Ortho-Tolyl Stibine as Stabilizer. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of G. E. Hulse, Jr., Passaic, N. J., U. S. A.

403,055. **Preservation of Rubber Hydrochloride** by Submerging It into Acetone and Maintaining It So Covered to Prevent the Release of Hydrogen Chloride, and a Package therefor. Canadian Industries, Ltd., Montreal, P. Q., assignee of A. Hershberger, Buffalo, N. Y., U. S. A.

403,349. **Preserving Rubber** by Vulcanizing a Rubber Composition Containing a Nitrogen-Containing Antioxidant and in Addition a Triaryl Stibine. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of L. H. Howland, Cheshire, Conn., U. S. A.

403,450. **Synthetic Rubber** Consisting of Gluten, Spirits of Turpentine, Sulphuric Acid, and Glycerine. J. C. Konow, Baltimore, Md., U. S. A.

403,485. **Heat-Stabilizing a Resinous Composition** (Conjoint Polymerization Product of Vinyl Chloride with Vinyl Acetate) by Adding a Stabilizing Agent (Metallic Aryl or Mixed Aryl-Alkyl Derivatives of Lead and Tin). Carbide & Carbon Chemicals, Ltd., Toronto, Ont., assignee of V. Yngve, Lakewood, O., U. S. A.

United Kingdom

542,932-542,934. **Resinous Condensation Products.** British Thomson-Houston Co., Ltd.

542,939. **Treatment of Rubber Latex.** C. I. Walsh and A. A. Newman.

542,966. **Molding Materials.** H. Kremer.

542,972-542,974. **Resinous Condensation Products.** British Thomson-Houston Co., Ltd.

543,019. **Manufacture of Rubber Articles.** R. F. McKay. (Soc. Italiana Pirelli).

543,096. **Resinous Condensation Products.** British Thomson-Houston Co., Ltd.

543,139-543,141. **Manufacture of Rubber.** United States Rubber Co.

543,143. **Manufacture of Hard Rubber.** R. Walker, E. W. B. Owen, and H. G. Miles, Ltd.

543,186. **Plastic Resin Compositions.** Resinous Products & Chemical Co.

543,224. **Catalytic Halogenation of Unsaturated Organic Compounds.** Shell Development Co.

UNCLASSIFIED

United States

2,273,043. **Wire Stripper.** H. W. Kiefer, Princeton, N. J.

2,273,200. **Tire Cord** Comprising Oriented Synthetic Linear Polyamide Filaments. G. P. Hoff, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,273,340. **Tire Removing Tool.** G. Van Zale, Bay City, Mich.

2,273,413. **Underinflated Tire Warning Device** Capable of Making a Clicking Sound When Flexed. W. C. McCulloch, Des Moines, Iowa.

2,273,431. **Producing Rutile Titanium Dioxide** by Subjecting Anatase Titanium Dioxide to Calcination in the Presence of Potassium Sulphate, Treating to Remove the Potassium Sulphate, and Recalcining to Convert the Pigment to Rutile Modification. J. E. Booge, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,273,462. **Demonstrating Device** to Simulate a Sudden Tire Tube Failure. W. M. Bryan, St. Petersburg, and W. F. Peters, Miami, both in Fla., assignors to Wingfoot Corp., Wilmington, Del.

2,274,126. **Tire Balance Weight Removing Pliers.** T. Carrigan, Lansing, Mich., assignor to Food Machinery Corp., San Jose, Calif.

TRADE MARKS

United States

393,023. **Kleinert's Pin-In.** Dress shields. I. B. Kleinert Rubber Co., New York, N. Y.

393,115. **Whirl-Eze.** Corsets. Rivoli Corset Co., Inc., New York, N. Y.

393,129. **Irv-O-Lite.** Plastic tubing for electrical insulation. Irvington Varnish & Insulator Co., Irvington, N. J.

393,136. Representation of a girl on a beach, and the word: **"Rejoicer's."** Footwear. B. Warshauer, Stockton, Calif.

393,244. **Dandy.** Tank balls. Lavelle Rubber Co., Chicago, Ill.

393,248. **Winter-Sured.** Anti-freeze composition. Firestone Tire & Rubber Co., Akron, O.

(Continued on page 198)

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Johnson's Wax Finishes have already been used with great success on auto parts, vacuum cleaner parts, stair treads, rubber-covered wire, toys and many other products. In addition to preventing or retarding oxidation, the finishes also contribute a natural, long-lasting high lustre.

Because of great coverage (approximately 2,000 feet per gallon, or higher), Johnson's Wax Finishes are extremely economical to use. May be applied by dipping, spraying or wiping onto surface. Available in 5 and 55 gallon drums, and in 1 gallon cans.

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Market Reviews

RUBBER SCRAP

APRIL scrap demands are reportedly little changed from March record levels. Collections have been under reclaim needs, but an intensive campaign has been undertaken in remote areas which may increase the flow. The WPB has asked that all types of rubber scrap be picked up for reclaim consumption. Prices are unchanged for those materials for which maximum ceilings have not been set by the OPA.

Consumers Buying Prices

(As of April 21, 1942)

Inner Tubes *†		Prices
No. 2 passenger tubes	lb.	$0.07¾/$0.08
Red passenger tubes	lb.	.07½/ .07¾
Mixed passenger tubes	lb.	.06¾/ .07
Tires		
Pneumatic Standard*‡		
Mixed passenger tires	ton	18.00 /19.00
Beadless passenger tires	ton	24.00 /25.50
No. 2 light colored carcass	ton	50.00 /52.50
No. 1 passenger peelings	ton	47.50 /50.00
Solid Tires		
Clean mixed truck	ton	46.00 /50.00
Light gravity	ton	55.00 /60.00
Boots and Shoes		
Boots and shoes, black	lb.	.01½/ .01⅝
Colored	lb.	.01¼/ .01⅜
Untrimmed arctics	lb.	.01¼/ .01⅜
Mechanicals		
Mixed black scrap	ton	32.00 /35.00
Hose, air brake	ton	32.00 /34.00
Garden, rubber covered	ton	12.00 /14.00
Steam and water, soft	ton	12.00 /14.00
No. 1 red	lb.	.05¼/ .05¾
No. 2 red	lb.	.04½/ .05
White druggists' sundries	lb.	.04¾/ .05
Mixed mechanicals	lb.	.03 / .03½
White mechanicals	lb.	.04¾/ .05
Hard Rubber		
No. 1 hard rubber	lb.	.16 / .17

*Ceiling prices. Higher price refers to premiums. †East of Rockies. ‡Akron.

Plans for Scrap Collection

Appearing before the House Interstate and Foreign Commerce Committee, March 27, Elliot E. Simpson, a director of L. Drexsage & Co., Inc., 29 W. 34th St., New York, N. Y., crude rubber brokerage, declared that a stockpile of from 10 to 20 million tons of scrap rubber exists in the households and dump yards of the nation.

Recently Mr. Simpson submitted two plans for scrap rubber collection. "The Industrial Rubber Plan", to ascertain the actual amount of scrap rubber available, consists of a series of questionnaires. All small and large junk dealers and scrap rubber wholesalers are asked to report on present stocks, the amounts they collect, and stock en route from others. Industrial plants and a group of 40 other scrap rubber sources are asked to report stock on hand and approximate monthly accumulations. Other questionnaires for rubber reclaimers, rubber manufacturers, and rubber machinery dealers ask for collateral information. The plan, Mr. Simpson claims, will show that the recent order restricting reclaim use is unnecessary.

"The Civilian Rubber Plan" outlines a method for determining the amount of scrap rubber in American homes and a means of collecting it. The plan, to be administered by local government officials, provides for the exchange of old rubber articles for new ones by the individual, and the award of silver and gold plated eagle medals for individual contributions of scrap rubber. Mr. Simpson said that each of the 30 to 35 million families in the United States have from 50 pounds to several tons of finished rubber products on hand.

RECLAIMED RUBBER

RESTRICTIONS in Amendments Nos. 6 and 7 to WPB rubber Order M-15-b are reportedly responsible for a lessened demand in April for reclaim for non-essential rubber products. But this demand has been replaced to some extent by calls for reclaim for compounding essential and war materials. Dealers feel that reclaim consumption at the present is changing so rapidly, especially as to source of demands, that definite information concerning requirements is difficult to obtain. In any case available supplies have not greatly increased. Prices quoted below are at established ceilings.

New York Quotations

Auto Tire	Sp. Grav.	¢ per lb.
Black Select	1.16-1.18	6½/ 6¾
Acid	1.18-1.22	7¾/ 7¾
Shoe		
Standard	1.56-1.60	7 / 7¼
Tubes		
Black	1.14-1.26	11¾/11½
Gray	1.15-1.26	12½/13¼
Red	1.15-1.32	12 /12¼
Miscellaneous		
Mechanical blends	1.25-1.50	4½/ 5¼
White	1.35-1.50	13½/14¼

The above list includes those items or classes only that determine the price bases of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

Fixed Government Prices*

Plantation Grades

	Price Per Lb.
No. 1-X R.S.S. in cases	$0.22½
No. 1 Thin Latex Crepe	.23
No. 2 Thick Latex Crepe	.23
No. 1 Brown Crepe	.21
No. 2 Brown Crepe	.21
No. 2 Amber	.21
No. 3 Amber	.21
Rolled Brown	.17

* For a complete list of government prices see our October 1, 1941, issue, p. 58.

New York Market Rubber Quotations

		Apr. 25 1941	Mar. 25, 1942	Apr. 22, 1942
		(Dollars and Cents)		
Latex				
Normal and concentrated (solid content)	lb.	.2753/.2816	.2825/.295	.2825/.295
Paras †				
Upriver fine	lb.	.29½	.....	.....
Upriver fine	lb.	*.32	.....	.....
Upriver coarse	lb.	.15	.....	.....
Upriver coarse	lb.	*.24	.....	.....
Islands fine	lb.	.29	.....	.....
Islands fine	lb.	*.32	.....	.....
Acre, Bolivian fine	lb.	.30	.....	.....
Acre, Bolivian fine	lb.	*.32	.....	.....
Beni, Bolivian fine	lb.	.31	.....	.....
Madeira fine	lb.	.29½	.....	.....
Caucho †				
Upper ball	lb.	.15	.....	.....
Upper ball	lb.	*.24	.....	.....
Lower ball	lb.	.14½	.....	.....
Pontianak				
Pressed block	lb.	.12/.25	‡	‡
Guayule				
Ampar	lb.	.15½	.....	.....
Africans				
Rio Nuñez	lb.	.19	.20	.20
Black Kassai	lb.	.19	.20	.20
Prime Niger flake	lb.	.30	.28	.28
Gutta Percha				
Gutta Siak	lb.	.16½	‡	‡
Gutta Soh	lb.	.25	‡	‡
Red Macassar	lb.	1.20	2.75	2.75
Balata				
Block Ciudad Bolivar	lb.	.43	‡	‡
Manaos block	lb.	.45	‡	‡
Surinam sheets	lb.	.52	‡	‡
Amber	lb.	.54	‡	‡

*Washed and dried crepe. Shipments from Brazil. †These Brazilian rubbers have been taken over by the Rubber Reserve Co., and no prices have as yet been set. ‡None available at present.

Rubber Industry Failures

Dun & Bradstreet, Inc., 290 Broadway, New York, N. Y., recently reported that failures were slightly more numerous in the rubber manufacturing division, but a considerable drop in liabilities for all divisions of the trade occurred in 1941. Most marked was the decrease in the retail divisions, where losses of $35,000 in 1941 were less than one-fifth that of 1940.

The first two months of 1942 compared favorably with the same period last year. Four failures in all divisions of the industry contrasted with seven in January and February, 1941.

MANUFACTURERS

Year	Number	Liabilities
1939	14	$78,000
1940	11	228,000
1941	16	130,000
Jan.-Feb., 1941	3	15,000
Jan.-Feb., 1942	1	5,000

WHOLESALERS

Year	Number	Liabilities
1939	11	$75,000
1940	10	103,000
1941	7	70,000
Jan.-Feb., 1941	1	15,000
Jan.-Feb., 1942	1	1,000

RETAILERS

Year	Number	Liabilities
1939	29	$187,000
1940	32	172,000
1941	8	35,000
Jan.-Feb., 1941	3	8,000
Jan.-Feb., 1942	2	9,000

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COMPOUNDING INGREDIENTS

AS MANUFACTURE of civilian rubber products continued to be curtailed under new WPB restrictions, April demands for some compounding ingredients decreased from previous levels. Prices are generally firm for materials on which maximums have not been set by the OPA.

CARBON BLACK. Movement of some types to the rubber industry for civilian goods has decreased, but the demand for semi-reenforcing blacks continues to exceed the supply owing in part to heavy loading to extend the rubber supply. Prices are firm.

CLAY. The call by rubber manufacturers was comparatively small and is expected to continue so during the next few months. Prices are firm.

FACTICE OR RUBBER SUBSTITUTE. Requirements are greater than the supply, reportedly because manufacturers are limited on the amount of domestic, as well as imported, oils they can use. Prices, in general, are steady.

LITHARGE. Movement was at levels higher than last year. Prices are steady.

LITHOPONE. Demand was at a high rate, but supplies were allocated, with consumers working on war orders receiving preference. Amendment No. 2 to OPA revised Price Schedule No. 80, released April 10, redefines lithopone to include "pure zinc sulphide", excepting fluorescent and chemically pure grades of zinc sulphides which are used respectively in the manufacture of fluorescent lamps and as laboratory reagents. Prices are at established ceilings.

RUBBER CHEMICALS. The call for rubber chemicals in general has decreased in accordance with curtailed consumption of crude rubber. A slight gain in demand for chemicals for reclaim compounding was reported. WPB Order M-18-b, released March 26 and immediately effective, limits the use of chromium in chemicals. Chromium pigment is restricted to 90% by months of the amount used in the year ended June 30, 1941. Prices are generally steady.

RUBBER SOLVENTS. Offerings were fair with reportedly less buying interest. Prices held steady.

TITANIUM PIGMENTS. The demand for titanium pigments has decreased to some extent and slightly more is now available for civilian products. Quotations are at ceiling prices.

ZINC OXIDE. Recent inquiries from rubber manufacturers for zinc oxide have been smaller than previously, and it is reported that available stocks are sufficient to cover rubber compounding needs at the present rate of consumption. General Preference Order M-11, under which the zinc and zinc oxide pools are operated and which was due to expire March 31, was extended to May 31, 1942, pending completion of a revised order. On March 28 it was announced that no zinc oxide need be set aside for the April pool. Early in April quotations on leaded zinc oxides were increased ¼¢ per pound. Prices on lead free zinc oxide are unchanged.

Current Quotations*

Abrasives

Pumicestone, powdered	lb.	$0.035 $0.04
Rottenstone, domestic	lb.	.025

Accelerators, Inorganic

Lime, hydrated, *l.c.l.*, New York	ton	25.00
Litharge (commercial)	lb.	.09
Magnesia, calcined, heavy	lb.	
technical, light	lb.	.0625/ .07

Accelerators, Organic

A-1	lb.	.26 / .35
A-10	lb.	.36 / .42
A-19	lb.	.52 / .65
A-32	lb.	.60 / .70
A-46	lb.	.50 / .57
A-77	lb.	.42 / .55
A-100	lb.	.42 / .55
Accelerator 49	lb.	
808	lb.	.60 / .62
833	lb.	1.15
Acrin	lb.	.65
Aldehyde ammonia	lb.	.65 / .70
Altax	lb.	.45
B-J-F	lb.	.40 / .45
Beutene	lb.	.60 / .65
Butasan	lb.	1.15
Butyl Eight	lb.	.98 / 1.00
C-P-B	lb.	2.00
Captax	lb.	.40
D-B-A	lb.	2.00
Delac A	lb.	.40 / .50
O	lb.	.40 / .50
P	lb.	.40 / .50
Di-Esterex-N	lb.	.50 / .60
DOTG (Di-ortho-tolyguanidine)	lb.	.44 / .46
DPG (Diphenylguanidine)	lb.	.36 / .36
El-Sixty	lb.	.40 / .47
Ethasan	lb.	1.15
Ethylideneaniline	lb.	.42 / .43
Formaldehyde P.A.C	lb.	.06 / .0625
Formaldehyde-para-toluidine	lb.	.65
Formaniline	lb.	.36 / .37
Guantal	lb.	.40 / .50
Hepteen	lb.	.35 / .40
Base	lb.	1.35 / 1.50
Hexamethylenetetramine U.S.P.	lb.	.39
Technical	lb.	.33
Lead oleate, No. 999	lb.	.1475
Witco	lb.	.15
Ledate	lb.	1.50
Methasan	lb.	1.25
Methazate	lb.	1.25
Monex	lb.	1.55
Morfex "33"	lb.	.68 / .73
"55"	lb.	.97 / 1.02
O-X-A-F	lb.	.40 / .45
Oxynone	lb.	.77 / .90
Para-nitroso-dimethylaniline	lb.	.85
Pentex	lb.	.75 / .85
Flour	lb.	.125 / .135
O	lb.	
Flour	lb.	
Phenex	lb.	.50 / .55
Pip-Pip	lb.	1.65
R & H 50-D	lb.	.42 / .43
Rotax	lb.	.50
Safex	lb.	1.20 / 1.30
Santocure	lb.	.60 / .67
Selenac	lb.	2.00
SPDX	lb.	.70 / .75
A	lb.	.70 / .75
Super sulphur No. 2	lb.	.14 / .16
Tetrone A	lb.	2.20
Thiocarbanilide	lb.	.28 / .33
Thionex	lb.	1.55
Thiurad	lb.	1.55
Trimene	lb.	.55 / .65
Base	lb.	1.05 / 1.20
Triphenylguanidine (TPG)	lb.	.45
Tuads, Methyl	lb.	1.55
2-MT	lb.	.75
Ulto	lb.	1.00 / 1.05
Ureka	lb.	.50 / .57
Blend B	lb.	.50 / .57
C	lb.	.48 / .55
Vulcanex	lb.	.42 / .43
Z-B-X	lb.	2.50
Zenite	lb.	.40 / .42
A	lb.	.45 / .47
B	lb.	.42 / .44
Zimate, Butyl	lb.	1.15
Ethyl	lb.	1.15
Methyl	lb.	1.25
Zipacel	lb.	1.65

Activators

Aero Ac 50	lb.	
Barak	lb.	.50
MODX	lb.	.30 / .35
SL No. 20	lb.	.11 / .115

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of known ingredients. Requests for information not recorded will receive prompt attention.

Age Resisters

AgeRite Alba	lb.	$2.00
Gel	lb.	.57 /$0.59
Hipar	lb.	.65 / .67
Powder	lb.	.52 / .54
Resin	lb.	.52 / .54
D	lb.	.52 / .54
White	lb.	1.25 / 1.40
Albasan	lb.	.70 / .75
Aminox	lb.	.52 / .61
Antox	lb.	.56
Betanox	lb.	.52 / .61
B-L-E	lb.	.52 / .61
Powder	lb.	.65 / .74
B-X-A	lb.	.52 / .61
Copper Inhibitor X-872-A	lb.	1.15
Flectol H	lb.	.52 / .65
White	lb.	.90 / 1.15
M-U-F	lb.	1.50
Neozone (standard)	lb.	.63
A	lb.	.52 / .54
C	lb.	.52 / .54
D	lb.	.52 / .54
E	lb.	.63
Oxynone	lb.	.77 / .90
Permalux	lb.	1.20
Santoflex B	lb.	.52 / .65
BX	lb.	.58 / .71
Santovar A	lb.	1.15 / 1.40
Stabilite	lb.	.52 / .54
Alba	lb.	.70 / .75
Thermoflex A.	lb.	.65 / .67
C	lb.	.58 / .60
Tysonite	lb.	.16 / .165
V-G-B	lb.	.52 / .61

Alkalies

Caustic soda, flake, Columbia (400-*lb. drums*)	100 lbs.	2.70 / 3.55
liquid, 50%	100 lbs.	1.95
solid (700-*lb. drums*)	100 lbs.	2.30 / 3.15

Antiscorch Materials

Antiscorch T	lb.	.90
Cumar RH	lb.	.105
E-S-E-N	lb.	.35 / .40
R-17 Resin (*drums*)	lb.	.1075
RM	lb.	1.25
Retarder W	lb.	.36
Retardex	lb.	.45 / .48
U-T-B	lb.	.35 / .40

Antisun Materials

Heliozone	lb.	.23 / .24
S.C.R.	lb.	.33 / .35
Sunproof	lb.	.23 / .28
Jr.	lb.	.165 / .215

Blowing Agents

Ammonium Carbonate, lumps (500-*lb. drums*)	lb.	
Unicel	lb.	.50

Brake Lining Saturant

B.R.T. No. 3	lb.	.0175/ .0185

Colors

Black

Du Pont powder	lb.	.42
Lampblack (commercial), *l.c.l.*	lb.	.15

Blue

Du Pont Dispersed	lb.	.35 / 3.95
Powders	lb.	2.25 / 3.75
Heliogen BKA	lb.	
Toners	lb.	

Brown

Mapico	lb.	.11

Green

Chrome	lb.	.25
oxide (*freight allowed*)	lb.	.24
Du Pont Dispersed	lb.	.98 / 2.85
Powders	lb.	1.00
Guignet's (*bbls.*)	lb.	.70
Toners	lb.	

Orange

Du Pont Dispersed	lb.	.88 / 2.35
Powders	lb.	2.75 / 3.05
Toners	lb.	

Orchid

Toners	lb.	

Pink

Toners	lb.	

Purple

Toners	lb.	

Red

Antimony Crimson, 15/17%	lb.	
R. M. P. No. 3	lb.	.48
Sulphur free	lb.	
R.M.P.	lb.	.52
Golden 15/17%	lb.	
7-A	lb.	.37
Z-2	lb.	.25
Cadmium, light (400-*lb. bbls.*)	lb.	.80 / .85
Du Pont Dispersed	lb.	.93 / 2.05
Powders	lb.	.60 / 1.65

Iron Oxide, *l.c.l.*	*lb.*	
Mapico	*lb.*	$0.0975
Rub-Er-Red (*bbls.*)	*lb.*	.0975
Toners	*lb.*	
White		
Lithopone (*bags*)	*lb.*	.0425/$0.045
Albalith	*lb.*	.0425/ .045
Astrolith (50-*lb. bags*)	*lb.*	.0425/ .045
Azolith	*lb.*	.0425/ .045
Titanium Pigments		
Ray-bar	*lb.*	.055 / .065
Ray-cal	*lb.*	.0525/ .0625
Rayox	*lb.*	.135 / .165
Titanolith (50-*lb. bags*)	*lb.*	.056 / .0585
Titanox-A	*lb.*	.145 / .175
B	*lb.*	.0575/ .0625
30	*lb.*	.0575/ .0625
C	*lb.*	.055 / .06
M	*lb.*	.0575/ .0625
RC	*lb.*	.055 / .06
RC-HT	*lb.*	.055 / .06
Ti-Tone	*lb.*	
Zopaque (50-*lb. bags*)	*lb.*	.145 / .1525
Zinc Oxide		
Azo ZZZ-11	*lb.*	.0725/ .075
44	*lb.*	.0725/ .075
55	*lb.*	.0725/ .075
66	*lb.*	.095 / .0975
French Process, Florence		
Green Seal-8	*lb.*	.09 / .0925
Red Seal-9	*lb.*	.085 / .0875
White Seal-7	*lb.*	.095 / .0975
Kadox, Black Label-15	*lb.*	.0725/ .075
No. 25	*lb.*	.085 / .0875
72	*lb.*	.0725/ .075
Red Label-17	*lb.*	.0725/ .075
Horse Head Special 3	*lb.*	.0725/ .075
XX Red-4	*lb.*	.0725/ .075
23	*lb.*	.0725/ .075
72	*lb.*	.0725/ .075
78	*lb.*	.0725/ .075
80	*lb.*	.0725/ .075
103	*lb.*	.0725/ .075
110	*lb*	.0725/ .075
St. Joe (lead free)		
Black Label	*lb.*	.0725/ .075
Green Label	*lb.*	.0725/ .075
Red Label	*lb.*	.0725/ .075
U.S.P.	*lb.*	.105 / .1075
Zinc Sulphide Pigments		
Cryptone-BA-19	*lb.*	.056 / .0585
BT	*lb.*	.056 / .0585
CB	*lb.*	.056 / .0585
MS	*lb.*	.0575/ .06
ZS No. 20	*lb.*	.0825/ .085
86	*lb.*	.0825/ .085
230	*lb.*	.0825/ .085
800	*lb.*	.0825/ .085
Sunolith	*lb.*	.0425/ .045
Yellow		
Cadmolith (cadmium yellow), (400-*lb. bbls.*)	*lb*	.55 / .60
Du Pont Dispersed	*lb.*	1.25 / 1.85
Powders	*lb.*	.70 / 1.75
Mapico	*lb.*	.0725
Toners	*lb.*	

Dispersing Agents

Bardex	*lb.*	.0425/ .045
Bardol	*lb.*	.025 / .0275
B	*lb.*	.05 / .0525
Darvan No. 1	*lb.*	.30 / .34
No. 2	*lb.*	.30 / .34
No. 3	*lb.*	.30 / .34
Nevoll (*drums, c.l.*)	*lb.*	.0225
Santomerse S	*lb.*	.11 / .25

Extenders

Extendex C.	*lb.*	
Naftolen	*lb.*	.15 / .25
Vanzak	*gal.*	.05 / .06

Fillers, Inert

Asbestine, *c.l.*	*ton*	20.00	
Asbestos Fiber	*ton*	15.50	/48.00
Barytes	*ton*	40.00	
f.o.b., St. Louis (50-*lb. paper bags*)	*ton*	25.55	
off color, domestic	*ton*	29.00	
white, domestic	*ton*	38.50	
Blanc fixe, dry, precip.	*lb.*	.04 / .0425	
Calcene	*ton*	37.50	/43.00
Infusorial earth	*lb.*	.0225	
Kalite No. 1	*ton*	26.00	
3	*ton*	36.00	
Kalvan	*ton*	100.00	
Magnesium Carbonate, *l.c.l.*	*lb.*	.0725	
Paradene No. 1 (*drums*)	*lb.*	.0525	
No. 2 (*drums*)	*lb.*	.0525	
Special (*drums*)	*lb.*		
20 to 35° C. M.P.	*lb.*	.0625	
35 to 45° C. M.P.	*lb.*	.0625	
45 to 75° C. M.P.	*lb.*	.0575	
Pyrax A	*ton*	7.50	
Whiting			
Columbia Filler	*ton*	9.00	/14.00
Suprex White	*ton*	32.50	
Witco, *c.l.*	*ton*	8.00	

Finishes

Black-Out (surface protective)	*gal.*	4.50 / 5.00
Mica, *l.c.l.*	*ton*	
Rubber lacquer, clear	*gal.*	1.00 / 2.00
colored	*gal.*	2.00 / 3.50
Shoe varnish	*gal.*	$1.45
Talc	*ton*	25.00

Flock

Cotton flock, dark	*lb.*	.09 /$0.11
dyed	*lb.*	.40 / .80
white	*lb.*	.12 / .20
Rayon flock, colored	*lb.*	1.00 / 1.50
white	*lb.*	.75 / 1.00

Latex Compounding Ingredients

Accelerator 552	*lb.*	1.65
Aerosol OT Aqueous 10%	*lb.*	
Antox, dispersed	*lb.*	.54
Aquarex D	*lb.*	.75
F	*lb.*	.85
MDL Paste	*lb.*	.25
Areskap No. 50	*lb.*	.18 / .24
100, dry	*lb.*	.39 / .51
Aresket No. 240	*lb.*	.16 / .22
300, dry	*lb.*	.42 / .50
Aresklene No. 375	*lb.*	.35 / .50
400, dry	*lb.*	.51 / .65
Black No. 25, dispersed	*lb.*	.22 / .40
Casein	*lb.*	
Collocarb	*lb.*	.07
Color Pastes, dispersed	*lb.*	.75 / 1.10
Copper Inhibitor X-872	*lb.*	2.25
Dispersex No. 15	*lb.*	.11 / .12
No. 20	*lb.*	.08 / .10
Factex Dispersion A	*lb.*	.17
Heliozone, dispersed	*lb.*	.25
MICRONEX, Colloidal	*lb.*	.06 / 07
R-2 Crystals	*lb.*	1.55 / 1.70
S-1 (400-*lb. drums*)	*lb.*	.65
Santobrite Briquettes	*lb.*	
Powder	*lb.*	
Santomerse D	*lb.*	.41 / .65
S	*lb.*	.11 / .25
Sodium Stearate	*lb.*	.40
Stablex A	*lb.*	.90 / 1.10
B	*lb.*	.65 / .90
C	*lb.*	.40 / .50
Sulphur, dispersed	*lb.*	.10 / .15
No. 2	*lb.*	.08 / .12
T-1 (440-*lb. drums*)	*lb.*	.40
Tepidone	*lb.*	.63
Tetrone A	*lb.*	2.20
Zenite Special	*lb.*	.47
Zinc oxide, dispersed	*lb.*	.12 / .15

Mineral Rubber

Black Diamond, *l.c.*	*ton*	25.00	/27.00
B.R.C. No. 20	*lb.*	.0105/	.0115
Hydrocarbon, Hard	*lb.*	25.00	/27.00
Parmr	*ton*	25.00	/29.00
Pioneer, *c.l.*	*lb.*	25.00	/27.00
285°-300°	*ton*	25.00	/27.00

Mold Lubricants

Aluminum Stearate	*lb.*	.21 / .24
Aquarex D	*lb.*	.75
MDL Paste	*lb.*	.25
Colite	*gal.*	.90 / 1.15
Lubrex	*lb.*	.25 / .30
Mold Paste	*lb.*	.12 / .30
Rubber-Glo, conc. regular	*gal.*	.94 / 1.15
Type W	*gal.*	.99 / 1.20
Sericite	*ton*	65.00
Soapstone, *l.c.l.*	*ton*	22.50
Zinc Stearate	*lb.*	.28 / .31

Oil Resistant

A-X-F	*lb.*	.82 / .85

Reclaiming Oils

B.R.V	*lb.*	.035 / .0375
C-10	*gal.*	.19 / .24
D-4	*gal.*	.17 / .22
E-5	*gal.*	.15 / .20
No. 1621	*lb.*	.021 / .0235
S.R.O.	*lb.*	.02 / .0225
Type C (for synthetic rubber)	*gal.*	.33 / .38
X-159	*gal.*	.29

Reenforcers

Carbon Black		
Aerfloted Arrow Specification (*bags only*)	*lb.*	.0355†
Arrow Compact Granulized	*lb.*	.0355†
Certified Heavy Compressed (*bags only*)	*lb.*	.0355†
Spheron	*lb.*	.0355†
Continental, dustless	*lb.*	.0355†
Compressed (*bags only*)	*lb.*	.0355†
Disperso	*lb.*	.0355†
Dixie	*lb.*	.0355†
Dixiedensed	*lb.*	.0355†
66	*lb.*	.0355†
Furnex	*lb.*	.035
Beads	*lb.*	.035
Gastex	*lb.*	.035 / .06
HX	*lb.*	.0355†
Kosmobile	*lb.*	.0355†
66	*lb.*	.0355†
Kosmos	*lb.*	.0355†
Dixie 20	*lb.*	.035†
MICRONEX Beads	*lb.*	$0.0355†
Mark II	*lb.*	.0355
Standard	*lb.*	.0355
W-5	*lb.*	.0355
W-6	*lb.*	.0355
P-33	*lb.*	.0475
Pelletex	*lb.*	.035 /$0.06
Thermax	*lb.*	.0225
"S"	*lb.*	.075 / .10
TX	*lb.*	.0355†
Velvetex	*lb.*	.04 / .06
"WYEX BLACK"	*lb.*	.0355†
Carbonex Flakes	*lb.*	.03 / .035
S	*lb.*	.031 / .036
Plastic	*lb.*	.031 / .0335
Clays		
Aerfloted Hi-White	*ton*	11.00
LGB	*ton*	15.00
Paragon (50-*lb. bags*)	*ton*	10.00
Suprex (50-*lb. bags*)	*ton*	11.00 /23.50
Catalpo, *c.l.*	*ton*	30.00
China	*ton*	25.00
Crown	*ton*	11.00
Dixie	*ton*	11.00
"L"	*ton*	
Langford	*ton*	8.50
McNamee	*ton*	10.00
Par	*ton*	11.00
Paraforce, *c.l.*	*ton*	50.00
Witco, *c.l.*	*ton*	10.00
Cumar EX	*lb.*	.05
MH	*lb.*	.065 / .115
V	*lb.*	.095 / .125
Silene	*lb.*	.04 / .045

Reodorants

Amora A	*lb.*	
B	*lb.*	
C	*lb.*	
D	*lb.*	
Curodex 19	*lb.*	
188	*lb.*	
198	*lb.*	
Rodo No. 0	*lb.*	4.00 / 4.50
10	*lb.*	5.00 / 5.50

Rubber Substitutes

Black	*lb.*	.085 / .13
Brown	*lb.*	.085 / .1375
White	*lb.*	.09 / .15
Factice		
Amberex Type B	*lb.*	.1875
Brown	*lb.*	.10 / .14
Fac-Cel B	*lb.*	.159
C	*lb.*	.159
Neophax A	*lb.*	.165
B	*lb.*	.165
White	*lb.*	.10 / .15

Softeners and Plasticizers

B.R.T. No. 7	*lb.*	.02 / .021
Bondogen	*lb.*	.98 / 1.05
Bunnatol (for synthetic rubber)	*lb.*	.40 / .50
Burgundy pitch	*lb.*	
Copene Resin	*lb.*	.32
Cycline oil	*gal.*	.14 / .20
Dipolymer Oil	*gal.*	.33 / .38
Dispersing Oil No. 10	*lb.*	.0375/ .04
LX-436 (*tank car*)	*lb.*	.027
Nevinol	*lb.*	.13 / .14
Nuba resinous pitch (*drums*)		
Grades No. 1 and No. 2	*lb.*	.029
3-X	*lb.*	.0425
Nypene Resin	*lb.*	.32
Palm oil (Witco), *c.l.*	*lb.*	
Palmalene	*lb.*	.15 / .25
Palmol	*lb.*	.16
Para Flux (reg.)	*gal.*	.17 / .18
No. 2016	*gal.*	.135 / .19
Para Lube	*lb.*	.046 / .048
Piccolyte Resins	*lb.*	.15 / .185
Piccoumaron Resins	*lb.*	.045 / .15
Pine tar	*gal.*	
Oil	*gal.*	
Plastogen	*lb.*	.0775/ .08
Plastone	*lb.*	.27 / .30
R-19 Resin (*drums*)	*lb.*	.1075
21 Resin (*drums*)	*lb.*	.1075
Reogen	*lb.*	.115 / .12
RPA No. 2	*lb.*	.65
3	*lb.*	.46
4	*lb.*	.80
Tackol	*lb.*	.085 / .18
Tonox	*lb.*	.52 / .61
Witco No. 20, *l.c.l.*	*gal.*	.20
X-1 resinous oil (*tank car*)	*lb.*	.011

Softeners for Hard Rubber Compounding

Resin C Pitch 45°C. M.P.	*lb.*	.015 / .016
60°C. M.P.	*lb.*	.015 / .016
75°C. M.P.	*lb.*	.015 / .016

Solvents

Beta-Trichlorethane	*lb.*	.20
Carbon Bisulphide	*lb.*	
Tetrachloride	*gal.*	
Cosol No. 1	*gal.*	.26
No. 2	*gal.*	.25
No. 3	*gal.*	.22
Industrial 90% benzol (*tank car*)	*gal.*	.15
Picco	*gal.*	.22 / .32
Skellysolve	*gal.*	

Stabilizers for Cure

Barium Stearate	*lb.*	.27 / .30

†Price quoted is f.o.b. works (bags). The price f.o.b. works (bulk) is $0.033 per pound. All prices are carlot.

Calcium Stearate	lb.	$0.23 /$0.27
Laurex (*bags*)	lb.	.15 / .175
Lead Stearate	lb.	
Magnesium Stearate	lb.	.29 / .32
Stearex B	lb.	.1525/ .1625
Beads	lb.	.147 / .157
Stearic acid, single pressed	lb.	.1525/ .1625
Stearite, *c.l.*	lb.	.1470
Zinc Laurate	lb.	.29 / .32
Stearate	lb.	.28 / .31

Synthetic Rubber

Neoprene Latex Type 56	lb.	.30
57	lb.	.30
60	lb.	.36
Neoprene Type CG	lb.	.70
E	lb.	.65
FR	lb.	.75
G	lb.	.70
GN	lb.	.65
I	lb.	.70
KN	lb.	.75
M	lb.	.65
Synthetic 100	lb.	.41
"Thiokol" Type "A"	lb.	.35
"FA"	lb.	.50
"RD"	lb.	.70

Tackifier

B.R.H. No. 2	lb.	.02 / .021
LX-433 (tank car)	lb.	.068

Vulcanizing Ingredients

Magnesia, light (for neoprene)	lb.	.26
Sulphur	100 lbs.	
Chloride (*drums*)	lb.	.04
Tellov	lb.	1.75
Vandex	lb.	1.75
(See also Colors—Antimony)		

Waxes

736 (clear)	gal.	1.25
737 (black)	gal.	1.35
1515-A (black)	gal.	1.35
Carnauba, No. 3 chalky	lb.	
2 N.C.	lb.	
3 N.C.	lb.	
1 Yellow	lb.	
2	lb.	
Carnube	lb.	.55 / .65
Montan	lb.	.12 / .17
Rubber Wax No. 118, Neutral	gal.	.83 / 1.38
Colors	gal.	.93 / 1.48

Financial

(*Continued from page* 172)

Crown Cork & Seal Co., Ltd. For 1941: net income, $302,798, or $3.03 each on 100,000 shares, against $243,245, or $2.43 a share, in 1940.

Dewey & Almy Chemical Co., Cambridge, Mass. For 1941: net income, $757,845, equal to $2.57 each on common and Class B shares, against $502,751, or $1.85 a common share, in 1940, after dividend payments on the preferred stock, retired last year.

Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., Canada. For 1941: net profit, $184,415, equal to $5.60 a preferred share and $2.52 a common share, compared with $146,584, or $4.45 and $1.86 a respective share in 1940.

Electric Storage Battery Co., Philadelphia, Pa., and subsidiaries. For 1941: consolidated net income, $3,312,415, equal to $3.64 each on 907,810 shares of capital stock outstanding, contrasted with $2,167,592, or $2.38 a share, in 1940; sales, $47,553,169, against $33,151,906 in 1940, and $28,408,743 in 1939.

Garlock Packing Co., Palmyra, N. Y. For 1941: net profit, $1,434,858, or $6.85 each on 209,250 shares, against $1,132,516, or $5.41 a common share, in 1940.

Flintkote Co., New York, N. Y., and subsidiaries. For 1941: net income, $1,737,661, equal, after preferred dividend requirements, to $2.34 each on 699,706 common shares, against $1,436,550, or $2.10 each on 685,196 shares, in 1940; taxes, $1,890,350, against $502,605; sales, $27,151,169, against $19,897,748.

General Cable Corp., New York, N. Y. For 1941: net profit, after $742,268 loss on sale of excess properties and equipment, $3,937,921, equal to $26.25 each on the 7% preferred stock showing a dividend arrears at the year-end of $52.50 each, compared with $2,455,362, or $16.37 a preferred share, in 1940; federal taxes, $8,760,000, against $1,155,000.

General Electric Co., Schenectady, N. Y. For 1941: net profit, $57,197,000, equal to $1.98 a common share, against $56,241,000, or $1.95 each, in 1940; net sales, $579,300,000, an all-time high, against $411,900,000; orders received, $1,132,800,000, against $654,200,000; taxes, $144,978,000, against $54,943,000.

L. H. Gilmer Co., Tacony, Philadelphia, Pa. For 1941: net income, $225,077, or $2.72 each on 82,824 shares, against $105,030, or $1.27 each in 1940; net sales, $2,654,855, against $1,506,771.

B. F. Goodrich Co., Akron, O. For 1941: consolidated net profit, after all charges including a write-off of $983,052, representing the company's investments and accounts receivable in the Far East, and a $6,000,000 reserve for contingencies, $8,608,324, equal, after preferred dividend requirements, to $5.02 each on 1,303,255 common shares, contrasted with $6,121,357, or $3.11 a common share, in 1940; consolidated net sales, $211,454,790, against $145,354,278; federal income and excess profits taxes, $10,810,000, against $2,200,000; current assets, including cash of $14,399,755, $93,098,009; current liabilities, $23,719,997; net working capital, $69,378,012, compared with $63,190,505 on December 31, 1940; inventories, $43,338,381, an increase of $1,882,729.

Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont. For 1941: net profit, $1,603,089, or $5.09 a common share, against $1,391,513, or $4.25 a share, in 1940; current assets, $11,786,007, against $10,385,347; current liabilities, $2,769,096, against $1,138,220; taxes, $4,228,062, against $2,503,188.

Hewitt Rubber Corp., Buffalo, N. Y. For 1941: net earnings, after reserves of $1,070,000 for federal income taxes and $200,000 for post-war adjustments, $396,304, or $2.35 each on 168,188 capital shares outstanding, against $280,701, or $1.68 a share, in 1940.

Monsanto Chemical Co., St. Louis, Mo., and American subsidiaries. For 1941: net earnings, $6,817,159, equal to $4.90 a common share, against $5,519,289, or $4.04 a share, in 1940; sales, $63,756,221, against $45,607,600; income taxes, $9,609,250, against $3,508,370.

Intercontinental Rubber Co., New York, N. Y., and subsidiaries. For 1941: net profit, $370,233.05, equal to 62¢ an outstanding share, against $323,614.38, or 54¢ a share, in 1940; income taxes, $254,543.62, against $198,399.94; current assets, including $1,217,457.46 cash, $1,569,429.99, against $1,402,811.98, including cash of $1,025,707.09, at the end of 1940; current liabilities, $461,372.46, against $266,479.49.

Lima Cord Sole & Heel Co., Lima, O. For 1941: net income, $130,065, or $1.16 each on 111,689 shares, against $42,502, or 38¢ a share in 1940; net sales, $1,205,041, against $670,730.

Minnesota Mining & Mfg. Co., St. Paul, Minn. For 1941: net income, after provision of $5,550,000 for income and excess profits taxes and $300,000 for special contingencies, $4,534,097, equal to $4.72 each on 961,260 common shares, contrasted with $4,188,786, or $4.36 a share, in 1940, when tax deductions were $2,635,000.

Mt. Vernon-Woodberry Mills, Inc., Baltimore, Md. For 1941: net income, $836,889, or $10.06 each, on 45,119 common shares after preferred dividend requirements, against $787,808, or $8.71 a common share in 1940.

National Lead Co., New York, N. Y., and wholly owned domestic subsidiaries. For 1941: net income, $5,375,685, equal, after preferred dividend requirements, to $1.10 a common share, against $6,102,702, or $1.34 a share, in 1940; federal income and excess profits taxes, $10,015,669, against $2,521,531; sales, $139,192,540, against $90,696,461.

National Rubber Machinery Co., Akron, O. For 1941: net income, $374,752, or $2.43 each on 154,000 capital shares, against net loss of $52,115 in 1940.

Philadelphia Insulated Wire Co., Philadelphia, Pa. For 1941: net income, $54,539, equal to $3.90 a share, against net loss of $24,126 the year before.

Pittsburgh Plate Glass Co., Pittsburgh, Pa. For 1941: net income, after provisions of $4,966,610 for depreciation and depletion, $14,989,178, equal to $6.82 a capital share, against $13,793,937, or $6.30 a share, in 1940; taxes, $18,365,151, against $8,273,241.

Raybestos-Manhattan, Inc., Passaic, N. J. For 1941: consolidated net profit, $2,053,037, equal to $3.27 each on 628,100 shares, against $1,696,926, or $2.70 a share in 1940; sales, $42,697,779, against $25,434,007; taxes, $5,575,984, against $1,545,913; total assets, $25,648,489.62; total liabilities, $6,607,553.81; reserve for contingencies, $1,100,000.

Timken Roller Bearing Co., Canton, O. For 1941: net profit, $9,476,838, equal to $3.92 a common share, against $8,995,211, or $3.72 a share, in 1940; taxes, $19,009,660, against $9,297,866.

(*Concluded on page* 196)

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NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Future	Feb. 28	Mar. 28	Apr. 4	Apr. 11	Apr. 18
Apr.	18.59	19.40	19.59	19.47	.....
May	.....	19.40	19.58	19.44	19.51
July	18.79	19.54	19.75	19.58	19.65
Sept.	18.84	19.61	19.86	19.72	19.75
Dec.	18.91	19.65	19.93	19.84	19.89
Jan.	18.94	19.66	19.96	19.86	19.91
Mar.	.....	19.75	20.03	19.94	20.00

New York Quotations

April 22, 1942

Drills	
38-inch 2.00-yard ..... yd.	....
40-inch 3.47-yard	....
50-inch 1.52-yard	$0.31
52-inch 1.85-yard	.25⅝
52-inch 1.90-yard	.24⅜/.25
52-inch 2.20-yard	.21¼
52-inch 2.50-yard	.19⅝
59-inch 1.85-yard	.25
Ducks	
38-inch 2.00-yard D. F. ..... yd.	.22½/.23
40-inch 1.45-yard S. F.	.30⅝
51½-inch 1.35-yard D. F.	.33⅜
72-inch 1.05-yard D. F.	.45¾/.50
72-inch 17-21 ounce	.57
Mechanicals	
Hose and belting ..... lb.	.48½
Tennis	
51½-inch 1.35-yard ..... yd.	.33¾
51½-inch 1.60-yard ..... yd.	.28¾
51½-inch 1.90-yard ..... yd.	.24½
Hollands—White	
Blue Seal	
20-inch ..... yd.	.13½
30-inch	.24½
40-inch	.27
Gold Seal	
20-inch No. 72 ..... yd.	.14½
30-inch No. 72	.25¾
40-inch No. 72	.29
Red Seal	
20-inch ..... yd.	.12½
30-inch	.23
40-inch	.24½
Osnaburgs	
40-inch 2.34-yard ..... yd.	.15¾
40-inch 2.48-yard	.14¾
40-inch 2.56-yard	.13992
40-inch 3.00-yard	.12½
40-inch 7-ounce part waste	.15
40-inch 10-ounce part waste	.21⅛
37-inch 2.42-yard clean	.15¼
Raincoat Fabrics	
Cotton	
Bombazine 64 x 60 ..... yd.	....
Plaids 60 x 48	....
Surface prints 64 x 60	....
Print cloth, 38½-inch, 64 x 60..	.08878
Sheetings, 40-Inch	
48 x 48, 2.50-yard ..... yd.	.16000
64 x 68, 3.15-yard	.13809
56 x 60, 3.60-yard	.11805
44 x 40, 4.25-yard	.09647
Sheetings, 36-Inch	
48 x 48, 5.00-yard ..... yd.	.08500
44 x 40, 6.15-yard	.06910
Tire Fabrics	
Builder	
17¼ ounce 60" 23/11 ply Karded peeler ..... lb.	.48
Chafer	
14 ounce 60" 20/8 ply Karded peeler ..... lb.	.47
9¼ ounce 60" 10/2 ply Karded peeler ..... lb.	.47
Cord Fabrics	
23/5/3 Karded peeler, 1/16" cotton ..... lb.	.48
15/3/3 Karded peeler, 1/16" cotton ..... lb.	.46
12/4/2 Karded peeler, 1/16" cotton ..... lb.	.47
23/5/3 Karded peeler, 1¼" cotton ..... lb.	.48
Leno Breaker	
8¼ ounce and 10¼ ounce 60" Karded peeler ..... lb.	.48

GAINS early in the month in the April cotton market were offset by later losses. Small and irregular selling resulted from a stand-off policy by the trade while awaiting an indication from Washington of how ceilings, when and if issued, will be applied and other contemplated government action. Price movements developed in steady trends, as reflected in the ⅞-inch spot middling which closed at 21.12¢ per pound March 31, rose gradually to 21.34¢ April 10, declined to 21.10¢ April 17, and closed at 20.91 April 29.

The use, sale, and delivery of future imports of eight top grades of Egyptian cotton were restricted by WPB Order M-17, announced April 2, to defense orders and the manufacture of sewing thread.

The Commodity Credit Corp. announced that the entire April quota of 300,000 bales (289,849 to the trade and 10,151 bales for export subsidy and new uses program) was sold at the average price of 90 points on July for ⅞-inch middling. It is reported that another sale is expected in May. About 400,000 bales remain in government stocks.

Domestic consumption of all cottons in March was 966,631 running bales, a new record high. The total, according to the Bureau of the Census, compares with 893,745 bales in February and 854,767 bales in March, 1941. Consumption for the full season is expected to be in excess of 11,000,000 bales. Mill stocks on March 31 were at a new high of 2,651,614 bales; stocks in public storage and at compresses were 11,352,967 bales.

Fabrics

April demands for cotton gray goods were accentuated from civilian sources and heavier in general than the offerings. High cotton prices early in the month resulted in sales that substantially exceeded production, and the volume of business was the largest since ceilings were established; while on key numbers the prices were the highest since 1924. But as cotton declined, mills were reluctant to offer cloth pending further price developments, and, while demand held good, offerings were scant. Prints cloths were sold in large volume with a considerable amount for civilian uses and deliveries into November, but later in the month only scattered sales were reported. Early April business in sheetings was heavy, with 90 days ahead the usual selling period, but toward mid-month offerings were not large. Government agencies did not succeed in getting all the drills wanted, and sales were even more restricted to other quarters. Army rejects and odds and ends were quickly taken. Large Navy orders for ducks were placed, but late summer deliveries are for the most part the earliest available for these and other wide heavy fabrics. Considerable sales of osnaburgs were reported.

The OPA issued on April 12 amendments effective April 9 to all sliding-scale cotton cloth and yarn price schedules which provide prices up to cotton bases of 21.96¢ to 22.28¢ per pound for various types of goods. Earlier schedules ran only up to 19.27¢ to 20.38¢ per pound cotton levels.

WPB Limitation Order L-99, issued April 21 and immediately effective, makes necessary the conversion in the next two months of a fifth of the looms of colored yarn goods mills to osnaburgs and sheetings production for sand bags, camouflage cloth, and agricultural bags. The order is expected to increase bag materials output from 751,500,000 yards to 1,515,500,000 yards annually. Continued heavy demand is expected by the cloth trade for early delivery to mills for civilian production.

Prices on drills and ducks are substantially unchanged. Varying fractional increases up to ⅛¢ per yard were reported for sheetings and raincoat fabrics. Tire fabrics are up 1¢ per pound. Prices quoted on osnaburgs are at established ceilings.

Financial

(*Concluded from page* 194)

Skelly Oil Co., Kansas City, Mo. For 1941: consolidated net income, $5,913,826, equal to $6.02 each on 981,348 capital shares, against $3,316,678, or $2.28 a share, in 1940; current assets $16,343,358; current liabilities, $7,898,307; inventories, $8,377,022, against $5,640,251.

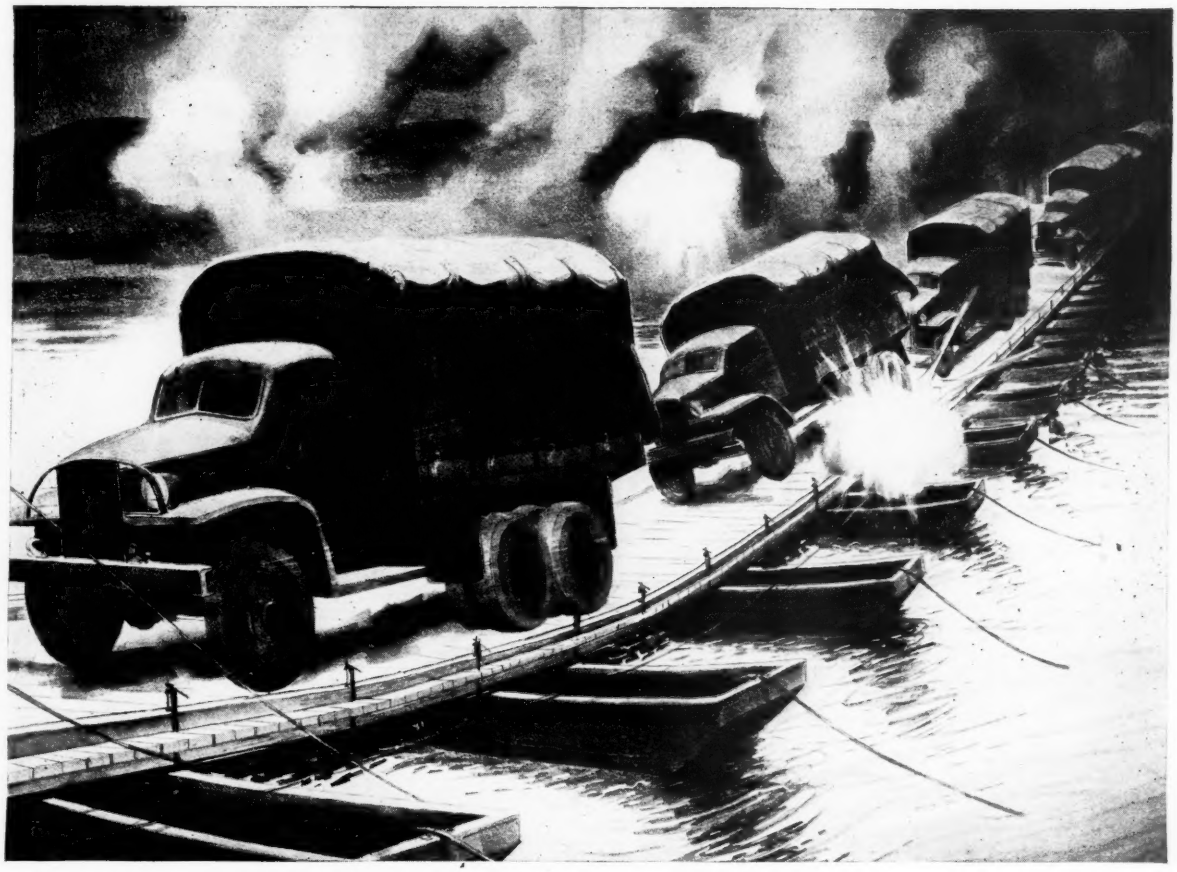
Sun Oil Co., Philadelphia, Pa. For 1941: consolidated net income, $16,532,540, the highest on record, equal to $6.21 a common share, against $7,969,068, or $3.03 a share, in 1940; current assets, $67,739,209, against $33,326,164; current liabilities, $31,728,108, against $12,690,067.

Thermoid Co., Trenton, N. J., and domestic subsidiaries. For 1941: net income, $678,609, equal, after dividend requirements on $3 cumulative convertible preferred, to $1.20 each on 476,388 shares of common stock, against $602,740, or $1.01 a common share, in 1940.

Western Electric Co., New York, N. Y. For 1941: net income, $18,428,000, or $3.07 each on the outstanding capital stock, against $32,787,000 in 1940; sales, $385,418,000, up 60%; taxes, $57,010,000, against $14,840,000.

Westinghouse Air Brake Co., Wilmerding, Pa., and subsidiaries. For 1941: net profit, $6,058,635, equal to $1.91 each on 3,172,110 shares of stock outstanding, against $5,591,606, or $1.76 each, in 1940; federal income and excess profits taxes, $9,634,391, against $3,894,976.

S. S. White Dental Mfg. Co., Philadelphia, Pa., and subsidiaries. For 1941: net profit, $616,257, or $2.06 each on 298,898 capital shares, excluding 1,102 treasury-held, contrasted with $340,583, or $1.15 a share, in 1940; taxes, $675,000, against $212,247.



SUPPLYING MECHANIZED FORCES is a problem in rapid, shifting transportation. Trucks—and more trucks—large and small—operating under Army Quartermasters—maintain a steady stream of supplies to the modern fighting forces. Heavily loaded, with tarpaulins covering and protecting the material inside—truck columns may have to push on through bombing attacks—cross rivers via pontoon bridges hastily set up by the engineers—and take whatever comes their way—in order to bring up supplies when they are needed.

Cotton plays its part in helping equip our soldiers and sailors as well as our mechanized forces. Because practically our entire duck production is under mandatory priority for Army and Navy requirements, your normal supplies of Hose and Belting Duck will be curtailed during the present emergency.

WELLINGTON SEARS COMPANY • 65 Worth Street, New York, N. Y.

Cottons FOR ~~DEFENSE~~ OFFENSE ... WELLINGTON SEARS FOR *Cottons*

STEARATES
ZINC
ALUMINUM • MAGNESIUM • CALCIUM
A Good DIRECT SOURCE of Supply
THE BEACON COMPANY
89 BICKFORD ST. BOSTON, MASS.
COLITE is THE Mould Lubricant

RUBBER SOLE CUTTING
The Patten Air Lift Machine will cut 3,500 to 6,000 pairs of taps or soles, from unvulcanized sheet rubber, in eight hours, producing a uniformly cut sole or tap with any beveled edge from 30° to 90°.
Standard type for cutting soling to ½ inch thick and Heavy Duty type for solings to over one inch thick.
Manufactured by
WELLMAN COMPANY
MEDFORD, MASS. U. S. A.

COLORS for RUBBER
Red Iron Oxides
Green Chromium Oxides
Green Chromium Hydroxides
Reinforcing Fillers and Inerts
C. K. WILLIAMS & CO.
EASTON, PA.

Carey PRODUCTS
OXIDE of MAGNESIA
SPECIAL LIGHT GRADE — TECHNICAL & U.S.P.
CARBONATE of MAGNESIA
TECHNICAL AND U.S.P. GRADES
THE PHILIP CAREY MFG. COMPANY
DEPENDABLE PRODUCTS SINCE 1873
LOCKLAND, CINCINNATI, OHIO

OBITUARY

Franklin B. Speakman

SPINAL meningitis caused the recent death in Mexico City, Mexico, of Franklin B. Speakman, special technical representative of The Goodyear Tire & Rubber Co., Akron, which he had joined in 1919. He had been in the chemical divisions of the company and had also been development manager at its Jackson, Mich., factory.

A graduate of Lehigh University, Mr. Speakman had been on special steel service for the United States Army before going to the rubber company.

Survivors included the widow and a brother.

Cremation followed the funeral services in Mexico City.

James F. Kiernan

JAMES F. KIERNAN, died in a New York hospital April 9 after a long illness. Born in New York, N. Y., January 30, 1893, Mr. Kiernan had been employed by Robert Badenhof Corp., rubber brokerage in New York, since October 15, 1924, and became secretary of the firm on January 1, 1930.

The deceased was a member of the New York Athletic Club, the Knights of Columbus, and the Leewood Golf Club.

Requiem mass was said April 13 at Our Lady of Refuge Church, The Bronx, N. Y., and burial was in Gate of Heaven Cemetery.

A wife, two daughters, his mother, a brother and a sister survive.

Louis W. Hottel

LOUIS W. HOTTEL died at Los Angeles, Calif., April 3, following a short illness. Mr. Hottel, who was well known in the rubber industry, was, at the time of his death, sales manager of the Pacific Hard Rubber Co. and of Western Molded Products, Inc., subsidiaries of the Stauffer Chemical Co., at Los Angeles. He was formerly connected with the Vulcan Rubber Co., Rub-Tex Products, Inc., and the Richardson Co. He was born July 6, 1880, at Fredericksburg, Ind.

A memorial service was held in Los Angeles, April 4, and burial was in Salem, Ind.

A wife and son survive.

Cedric S. Johnson

CEDRIC SEAVEY JOHNSON, for the past 11 years manager of Stedfast Rubber Co. (Canada), Ltd., Granby, P. Q., died of a sudden heart attack. Born in Granby 55 years ago, Mr. Johnson attended the local grade and high schools and after graduation worked for the Granby Rubber Co., Ltd. Then for many years he was with the Stoughton Rubber Co., Stoughton, Mass., before he returned to Canada as manager of the new Stedfast factory in Granby.

The deceased belonged to the Masons, the Canadian Manufacturers' Association, and the Granby Board of Trade.

He leaves a wife, a son, a daughter, his father and stepmother, and a brother.

Funeral services were held in the Granby United Church, with interment in Pinewood Cemetery.

TRADE MARKS

(*Continued from page* 188)

393,272. **"Vulco" Bond.** Articles formed from rubber bonded to metal. Gates Rubber Co., Denver, Colo.

393,275. **No-Mar.** Adhesive tapes and sheets. Minnesota Mining & Mfg. Co., St. Paul, Minn.

393,276. **Vacuum-Grip.** Clothing. G. Blankstein, doing business as George Blankstein Co., New York, N. Y.

393,295. Representation of sections of two rippled ribbons above and below the word: **"Kayser."** Clothing. Julius Kayser & Co., New York, N. Y.

393,301. **"Sunbabe."** Dolls. Sun Rubber Co., Barberton, O.

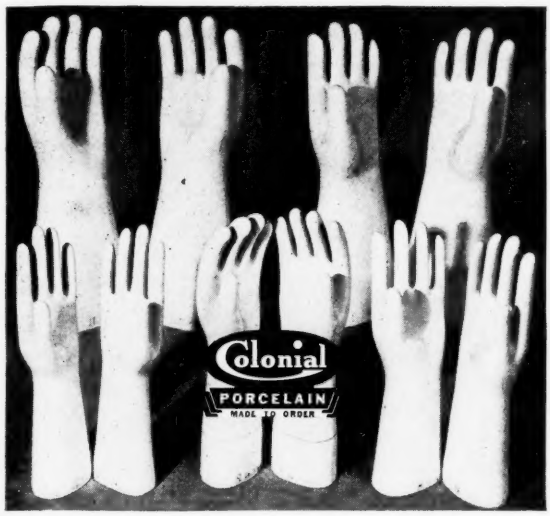
393,303. Representation of a circle containing the letters: **"A E Co."** Insulated wires and cables. American Electric Cable Co., Holyoke, Mass.

393,309. **Blue Ribbon.** Tires and tubes. S & M Tires & Auto Supply Co., Minneapolis, Minn.

393,330. **Bestform. The Foundation of American Beauty.** Foundation garments, etc. Bestform Foundations, Inc., New York, N. Y.

393,335. **Bowl0Mocc.** Footwear. Endicott Johnson Corp., Endicott, N. Y.

393,345. **Cream'n Coffee.** Shoes. Commonwealth Shoe & Leather Co., Whitman, Mass.



Porcelain Glove Forms

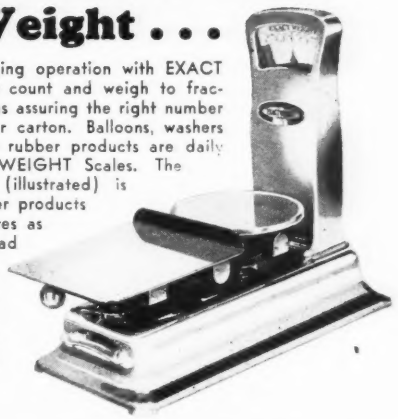
—for dipped rubber gloves, including linemen's or electricians' gloves and surgeons' gloves. Some are made from our own stock molds and others from customers' molds.

Write today for our new catalog covering rubber glove and other forms for dipped rubber goods. Prompt attention given to requests for quotations based on your specifications or stock items.

The Colonial Insulator Company
Akron, Ohio, U. S. A.

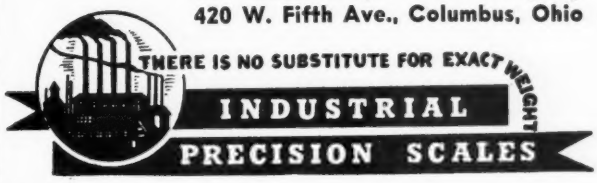
Exact Weight Scales

Package Rubber Parts by Weight . . .

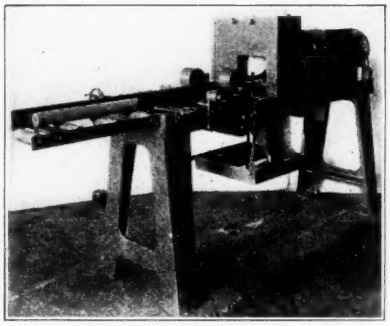


Speed up your packaging operation with EXACT WEIGHT Scales. They count and weigh to fraction-ounce accuracy thus assuring the right number of units per package or carton. Balloons, washers and hundreds of other rubber products are daily packaged on EXACT WEIGHT Scales. The new model No. 273 (illustrated) is ideally suited for rubber products packaging. Such features as speed . . . easy-to-read dials . . . trouble-free operation all make this model your number one equipment for the packaging job. Write for full details today.

The Exact Weight Scale Company
420 W. Fifth Ave., Columbus, Ohio



SLICER MACHINE FOR EXTRUDED STOCKS



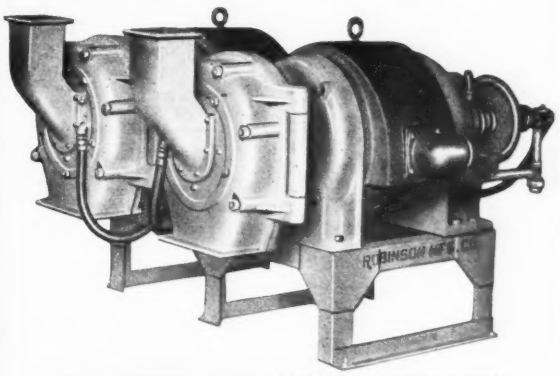
With High Speed Disc Cutting Blade, Automatic Feed and with Tandem Feed Wheels. Capacity Section Up to 3" by 4½"—Length ⅛" to 4".

UTILITY MANUFACTURING COMPANY
Cudahy, Wisconsin

Cable Address: UTILITY-MILWAUKEE
Long Distance Phone Call
MILWAUKEE—SHERIDAN 7020

SINGLE - TWIN - TRIPLE

FRIGIDISC GRINDERS



FOR RUBBER RECLAIMING OPERATIONS

Announced a year ago, these grinders are proving highly satisfactory in the Rubber Industry.

This grinder was developed prior to the current emergency and has proven itself by performance, and is a further development of the Attrition Mill principle. The product is ground between two hard iron grinding discs and heat generated is dissipated by a constant flow of water or other cooling liquid against the backs of the plates. Plates may be renewed conveniently and are economical in cost. We also manufacture Sifting, Mixing, Elevating, Conveying and Handling Equipment and complete installations are designed by our competent Engineering Department.

Write for Catalog 37-A and tell us your requirements.

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722 Painter Street **MUNCY, PA.**

THE SOLUTION

to the high cost of form breakage: Use

SEVILLE FORMS

The porcelain plug prevents loose fasteners and 90% of the breakage at the base . . . saves you big money. Write for details.

SEVILLE PORCELAIN CO., SEVILLE, O.

Largest Exclusive Manufacturers of Crase-Proof Vitrified Porcelain Forms

New England Butt Company

ESTABLISHED 1842

Builders of

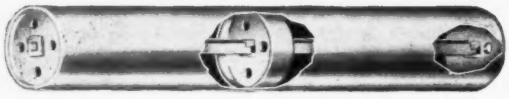
INSULATED WIRE MACHINERY

WRITE FOR CATALOG

Dept. I-5 Providence, R. I.

NEW AND BETTER GAMMETER'S

ALL STEEL ALL WELDED CALENDER STOCK SHELL



4" 5" 6" 8" 10" 12" diameters, any length.
Besides our well known Standard and Heavy Duty Constructions, we can supply light weight drums made up to suit your needs.

THE W. F. GAMMETER COMPANY

CADIZ, OHIO

STEARATES

SPECIAL QUALITIES FOR THE RUBBER TRADE

ZINC • ALUMINUM
MAGNESIUM • CALCIUM

Quality Is Our First Consideration.

WHITTAKER, CLARK & DANIELS, INC.

260 WEST BROADWAY • NEW YORK CITY

2453

Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

	—February, 1942—		Two Months Ended —February, 1942—	
UNMANUFACTURED	Quantity	Value	Quantity	Value
Crude rubber, etc.....lb.	.....	.....	.....	.....
Latex (dry weight) .....lb.	.....	.....	.....	.....
Gutta percha .....lb.	.....	.....	10,088	$8,981
Rubber, recovered .....lb.	2,121,600	$151,087	5,053,500	365,207
Rubber, powdered, and gutta percha scrap .....lb.	1,312,800	50,268	1,748,200	67,311
Balata .....lb.	3,133	1,613	3,133	1,613
Rubber substitute .....lb.	206,700	49,748	325,600	82,571
Totals	3,644,233	$252,716	7,140,521	$525,683
PARTLY MANUFACTURED				
Hard rubber comb blanks....	.....	.....	.....	$375
Hard rubber, n. o. s.....lb.	810	$815	2,186	2,774
Rubber thread not covered.lb.	1,043	1,021	1,043	1,021
Totals	1,853	$1,836	3,229	$4,170
MANUFACTURED				
Bathing shoes .....prs.	2,905	$1,103	2,905	$1,103
Belting	.....	21,319	.....	40,372
Hose	.....	26,270	.....	54,307
Packing	.....	12,402	.....	27,411
Boots and shoes .....prs.	1,159	824	1,405	1,385
Canvas shoes with rubber soles .....prs.	.....	.....	.....	.....
Clothing, including waterproofed	.....	1,777	.....	4,943
Raincoats .....no.	2,965	15,618	9,508	53,304
Gloves .....doz. prs.	176	550	827	2,043
Hot water bottles	.....	128	.....	228
Liquid sealing compound....	.....	.....	.....	.....
Tires, bicycle .....no.	241	228	830	655
Pneumatic .....no.	89	1,000	230	2,900
Solid for automobiles and motor trucks .....no.	12	216	101	6,367
Other solid tires.....	.....	2,664	.....	3,197
Inner tubes .....no.	6	27	21	104
Bicycle .....no.	165	58	792	232
Mats and matting	.....	16,523	.....	25,907
Cement	.....	26,035	.....	43,764
Golf balls .....doz. prs.	2,936	6,095	5,024	10,567
Heels .....prs.	17,123	1,764	20,474	2,011
Other rubber manufactures..	.....	195,635	.....	395,952
Totals	.....	$330,236	.....	$676,752
Totals, rubber imports..	.....	$584,788	.....	$1,206,605

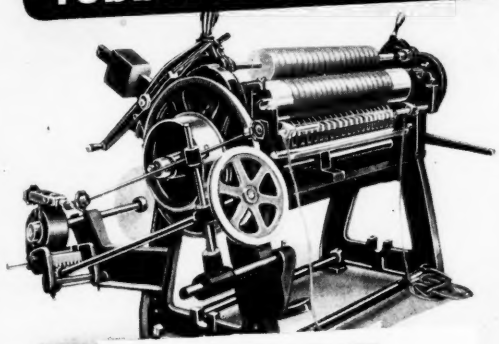
Exports of Domestic and Foreign Rubber Goods

	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
UNMANUFACTURED				
Crude rubber	.....	.....	.....	.....
Waste rubber	$19,054	.....	$31,056	.....
MANUFACTURED				
Belting	$17,342	.....	$20,651	.....
Bathing caps	114	.....	136	.....
Canvas shoes with rubber soles.	1,909	.....	20,061	.....
Boots and shoes	183,127	.....	288,680	.....
Clothing, including waterproofed	19,818	.....	36,731	.....
Heels	287	.....	2,450	.....
Hose	13,875	.....	25,196	.....
Soles	62	.....	1,271	.....
Soling slabs	.....	.....	.....	.....
Tires, pneumatic	1,317,253	.....	2,211,918	.....
Not otherwise provided for..	81,128	.....	119,250	.....
Inner tubes	108,216	.....	171,810	.....
Other rubber manufactures..	6,249	.....	12,888	.....
Totals	$1,749,380	.....	$2,911,042	.....
Totals, rubber exports...	$1,768,434	.....	$2,942,098	.....

Dividends Declared

COMPANY	STOCK	RATE	PAYABLE	STOCK OF RECORD
Crown Cork & Seal Co.....	Com.	$0.50 q.	May 15	Apr. 30
Dayton Rubber Mfg. Co.....	Com.	$0.25	May 1	Apr. 17
Dayton Rubber Mfg. Co.....	"A"	$0.50 q.	May 1	Apr. 17
DeVilbiss Co.	Com.	$0.50	Apr. 15	Mar. 30
DeVilbiss Co.	7% Pfd.	$0.175 q.	Apr. 15	Mar. 30
L. H. Gilmer Co.	Com.	$0.25	Apr. 15	Apr. 1
Lima Cord Sole & Heel Co..	Com.	$0.10 irreg.	Apr. 10	Apr. 3
Midwest Rubber Reclaiming Co.	Com.	$0.50	May 1	Apr. 20
Norwalk Tire & Rubber Co..	7% Pfd.	$1.3125 accum.	May 11	Apr. 25
Plymouth Rubber Co.....	7% Pfd.	$1.75 q.	Apr. 15	Apr. 6
Plymouth Rubber Co.....	"B"	$1.00	Mar. 15	Mar. 10
A. G. Spalding & Bros., Inc..	$1.50 1st Pfd.	$3.00	.....	.....
U. S. Rubber Reclaiming, Inc..	8% Pr. Pfd.	$0.50 accum.	Apr. 20	Apr. 14

CAMACHINE 26-2
For all rubber and rubberized fabrics



A USER SAYS:

"Paid for itself in eight months. Made further savings by securing more cuts from the width of material. Better service to customers, special widths cut in a few minutes notice."

WRITE FOR FOLDER

CAMERON MACHINE COMPANY, 61 Poplar Street, Brooklyn, New York
MIDWEST OFFICE: Harris Trust Building, 111 West Monroe Street, Chicago

The H. O. Canfield Co.

MANUFACTURE

Molded Specialties, Plumbers' Rubber Goods, Valves, Gaskets, Hose Washers, and Cut Washers of all kinds

Write for prices and samples

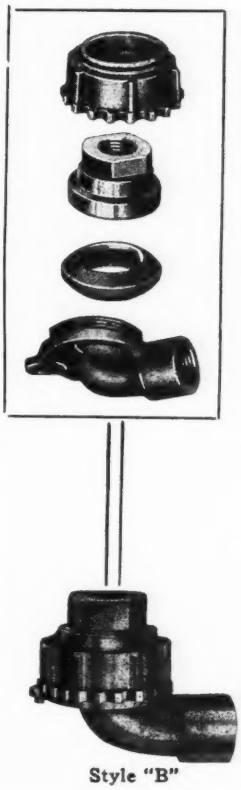
Offices and Works Bridgeport, Conn.
Chicago Office: 424 North Wood Street

FINELY PULVERIZED—BRILLIANT

COLORS
for RUBBER

Chicago Representative FRED L. BROOKE 228 N. La Salle St.
Pacific Coast Representative MARSHALL DILL San Francisco
Cleveland, PALMER-SCHUSTER CO., 975-981 Front St.

Manufactured by
BROOKLYN COLOR WORKS, INC.
Morgan and Norman Avenues Brooklyn, N. Y.



Style "B"

Just 4 Parts!

ON platen presses, tire and tube molds, or wherever a swing joint is required in the rubber industry, you'll find FLEXO JOINTS. They're there because they have proven dependable and efficient. And they are extremely simple both in construction and to install and service.

Made in four styles and in standard pipe sizes from ¼ inch to 3 inches. Your regular supply house has them or order direct from

FLEXO SUPPLY CO.
4218 Olive Street
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FLEXO

FRENCH OIL 1005-TON
Upward Acting
HOT BED PRESS

Model 2122

Will Help Increase Production and Cut Costs.

32" Diameter, 16" Stroke, Eight 2" Openings, 42" x 54" Pressing Surface. Working Pressure 2,000 Pounds.

Write for Bulletin "Modern Hydraulic Presses."

Hydraulic Press Division
The FRENCH OIL MILL MACHINERY CO.
PIQUA OHIO

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Allow nine words for keyed address. *Replies forwarded without charge*

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PRODUCTION MANAGER: EXPERIENCED IN MOLDED GOODS, mechanicals, and sponge rubber products. Supervising of plant and related departments. Address Box No. 412, care of INDIA RUBBER WORLD.

RESEARCH AND COMPOUNDING RUBBER CHEMIST, WITH 13 years' experience in large European rubber plant as supervisor. Knowledge of all phases of footwear, sponge, molded articles, production. Experienced with synthetic rubber products. Expert in reclaimed rubber to replace crude rubber. Excellent references. Address Box No. 413, care of INDIA RUBBER WORLD.

TECHNICAL AND PRODUCTION MAN CAPABLE OF ASSUMING full responsibility in a mechanical goods plant. Address Box No. 415, care of INDIA RUBBER WORLD.

PRODUCTION MANAGER, NOW EMPLOYED, DESIRES NEW connections. Capable technical superintendent. 20 years' experience in development and production of mechanical, sponge and synthetic rubber products. Familiar with all phases of manufacture. Especially competent in production of products made from reclaimed rubber. Address Box No. 419, care of INDIA RUBBER WORLD.

PRACTICAL RUBBER CHEMIST, 14 YEARS' EXPERIENCE COMpounding and processing for tires, mechanical and proofed goods, involving natural rubber and all synthetics. Also experienced with latex, airfoam sponge, and dipped goods. Ph.D. Have held supervisory positions. Location immaterial. Address Box No. 420, care of INDIA RUBBER WORLD.

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WANTED—THERMOPLASTIC SCRAP OR REJECTS in any form; acetate, butyrate, nitrate, styrene, acrylic and vinyl resin materials. Highest prices paid. Submit samples and details of quantities for quotations. Address Box No. 418, care of INDIA RUBBER WORLD.

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WANTED: RUBBER CHEMIST. PRACTICAL FACTORY MAN. Experienced in rubberized fabrics. Able to assume responsibility for new department, to include technical, manufacturing, and supervisory, and occasional outside contacts. Write with full background and abilities to Box No. 411, care of INDIA RUBBER WORLD.

MECHANICAL GOODS SUPERINTENDENT OR General Foreman—Must be familiar with all operations and able to handle labor satisfactorily. Excellent opportunity with old-established rubber company. State age, education, and complete experience first letter to Box No. 414, care of INDIA RUBBER WORLD.

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FOR SALE OR LICENSE ON ROYALTY BASIS. Improved internal mixer covered by recent U. S. patent. This mixer has many advantages over anything now on the market. Rubber compounders and Plastic manufacturers should investigate. Address Box No. 416, care of INDIA RUBBER WORLD.

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STOCK SHELLS HOSE POLES
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MECHANICAL MOLDED RUBBER GOODS
Sponge Rubber: Sheeted—Die Cut—Molded
We Solicit Your Inquiries
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SOLE PRODUCERS
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QUICK DELIVERIES ON HIGH SPECIFICATION WORK
Molded Goods / Lathe Cut Goods — Rubber or Synthetic — Tubing / Sponge
MARTIN RUBBER COMPANY, INC.
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GUAYULE RUBBER
Washed and Dry, Ready for Compounding
PLANTATION RUBBER
From Our Own Estates in Sumatra
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CROWN CLAY
APPROVED BY RUBBER CHEMISTS
SOUTHEASTERN CLAY COMPANY, AIKEN, SOUTH CAROLINA
CROWN CLAY

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FOR SALE: 1—Watson-Stillman Hydro-Accumulator; 20 Hydraulic Presses, 12x12 up to 38x78; Pumps and Accumulators; 9x18" Mill also 15x36, 16x42, 18x50; 1—Royle 2½ Tuber; other Hydraulic Pumps, Hydraulic Presses, Tubers, Calenders, Vulcanizers, etc. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York, N. Y.

FOR SALE: W. & P. MIXERS, LAB. TO 200 GAL.; CHANGE Can Mixers, 8 to 80 gal.; Vacuum Shelf Driers; Preforming Machines etc. Cash buyers of your surplus equipment. Your inquiries solicited. BRILL EQUIPMENT CORPORATION, 183 Varick Street, New York City.

FOR SALE: 1—NO. 20 BANBURY MIXER, DIRECT CONNECTED to 600 HP slip ring motor, stellite rotors, used approximately 8 months. Address Box No. 410, care of INDIA RUBBER WORLD.

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FOR SALE—JUNE DELIVERY: INDIVIDUAL DRIVEN 16" x 42" Thropp Mill complete with 50 h.p., 440-volt, 3-phase motor reduction gear and bed plate. Now running. PASSAIC RUBBER CO., Clifton, N. J.

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WANTED: RUBBER MILL, 10" x 24" ROLLS OR THEREABOUTS, in A-1 condition; also miniature mill, approximately 2"x6" rolls. Address Box No. 409, care of INDIA RUBBER WORLD.

WANTED: ELECTRIC OVEN FOR LABORATORY, WITH TEMperature regulator for use up to 120° C. AIRLASTIC RUBBER CO., 904 Blackhawk St., Chicago, Ill.

WANTED: 1—Banbury Mixer; 2—Mills; 1—Calender; 5—Hydraulic Presses, with pump and accumulator; 2—Tubers. Address Box No. 421, care of INDIA RUBBER WORLD.

New Rubber Spreaders, Churns, Pony Mixers. Saturators.
Used — Rebuilt — Rubber — Chemical — and Paint Machinery.
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An International Standard of Measurement for—
Hardness • Elasticity • Plasticity of Rubber, etc.
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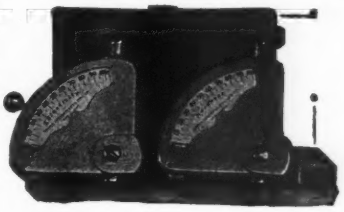

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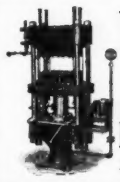

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